THE LAND MOLLUSCA OF LORD HOWE ISLAND.

By Tom Iredale.

(Plates xvii.-xx.)

(*Contribution from The Australian Museum, Sydney, N.S.W.*)

Years ago I reported upon the Land Mollusca of the Kermadec Islands, and made contrast with that known from Norfolk and Lord Howe Islands. Later I discussed in more detail the series collected by Roy Bell at Norfolk Island with that of the Kermadec Islands, and anticipated a discussion with material arriving from Lord Howe Island from the same collector, Mr. Roy Bell. Before it is too late an account is here produced, and it has the advantage that in the intervening years I have examined much material, having listed the land shells of Australia and Papua.

The collections made by Roy Bell passed through my hands, and were studied by H. B. Preston, who discriminated and named many genera and species, but the names have not been published, though series were distributed. There is a series of "cotypes" in the Australian Museum, and these have been used for description, the names attached being retained. Much additional material has been available, and the specimens have all been reviewed again and again, and it is certain that this remarkable faunula is not yet completely known, though the present essay records an almost incredible number for such a small island.

Lord Howe Island is situated about 450 miles north-east from Sydney, and is a political appanage of this State, but not by any means a zoological part. It is a small crescent-shaped islet, the small northern ridges rising to 700 odd feet, being separated from the main rocky mass by sandy lowlands, the bulk of the island being the two heights, Mt. Lidgbird, rising to 2,504 feet, and Mt. Gower, 2,840 feet, connected by a saddle some 1,000 feet, from which a deep gully known as the Erskine Valley runs to the western sea. The climate is temperate, and the rainfall good, so that the vegetation is dense.

An excellent account of the history of the island and the zoological collectors has been published by Hindwood in the *Emu,* Vol. xl., July, 1940, and also issued separately, entitled: "The Birds of Lord Howe Island." Although the island was discovered in 1788, none of the earlier visitors apparently collected land shells until Macdonald and Macgillivray called there in the Herald in 1852 and 1853. The latter was a brilliant collector and sent his finds to London, where some specimens fell into the hands of Cuming, and hence acquired description. It may be recalled that Macgillivray's collection of Kermadec shells went to the British Museum, and reposed there undisturbed for some sixty years. It may be that part of this Lord Howe Island collection suffered a similar fate, but, anyhow, the collections were confused with those from another Lord Howe Island in the New Hebrides, and the confusion still remains.

Brazier has reported that Macgillivray collected ten species, but this seems to have been surmised, from the published accounts only. Macdonald observed once that he had collected three species of one genus, but did not mention anything further. As noted, these were described in London, but

all the succeeding work appeared in Sydney, through local collectors, Masters, Brazier and Morton, visiting the island in 1869, 1872-73 and 1882 respectively. Then a wave of enthusiasm led to the Australian Museum Expedition of 1887, which resulted in a "Memoir" on the island. It was led by R. Etheridge, Jr., and T. Whitelegge is recorded as the collector of mollusca, seven new species of land shells being added. The Museum continued its interest, Waite, McCulloch, Hedley, North and Hull visiting it between 1900-1910,' and since then Troughton, Musgrave, Whitley, Miss Allan and myself have collected there. While specimens have accumulated from these visits, practically no written account has appeared since Hedley recorded the results of the 1887 Expedition.

G. M. Mathews secured the services of Roy Bell, of the Kermadec Islands, for the investigation of the ornithology of Norfolk Island and Lord Howe Island. Roy Bell and I had explored the Kermadecs together, and he collected molluscs on the same system at Norfolk Island, where he made an extraordinary collection. He continued with those of Lord Howe Island, a really wonderful collection, and the basis of this report.

A plate (xvii.) is attached, giving two views of the island, one from the old settlement, looking southward. In the foreground, on the right, lies Goat or Rabbit Island, while the two mountains are clearly seen in the back. The nearest, Mt. Lidgbird, is separated from Mt. Gower, which is higher, by a deep ravine, known as the Erskine Valley, which reaches up about one thousand feet, the height of the connecting saddle between the two mountains. Anywhere, about the saddle, is regarded as the heights, while the "Summit of Mt. Lidgbird" was never reached, until Roy Bell made a track, all previous citations being to low altitudes.

The other view is from the Lower Road, across the base of the wall of Mt. Lidgbird, looking northwards; it takes in all the lagoon: again showing Goat Island, and shows the North Ridge in the distance, the curious peak on the left being known as Mt. Eliza. In between the North Ridge and Mt. Lidgbird is low uneven country, ranging from sea level up to 700 ft., and this is regarded as the Lowlands. An appreciable extent of this lowlands is blown coral sand, sometimes forming coralsand rock. Other localities cited are well-known, locally, though some will not appear on ordinary maps.

Etheridge, Jnr., and Hedley wrote "Ledgbird," but the acknowledged spelling is now "Lidgbird," and this spelling has been used throughout.

My very sincere thanks are here tendered for the excellent drawings made by Miss Joyce Allan, who has recently returned to the Museum, after two years' absence on war duties.

Class Gastropoda.

Subclass Prosobranchia.

Order Pectinibranchia.

Family Georissidae.

There seems to be no good reason for continuing the association of the Indo-Pacific Georissid forms with the Mediterranean and Atlantic species of *Hydrocena* in a family Hydrocenidae, so the former are here separated as above.

The Lord Howe representative is reported as living on moss on the S.S.E.

side of Mt. Gower, among dry leaves at North Bay, and in crevices of the cliffs half-way up Mt. Lidgbird in dryish places.

Genus Monterissa, *nov.*

Type, *M. gowerensis, nov.*

Similar to the Australian *Omphalorissa*, but the shell lacks spiral sculpture, the pad is restricted to the anterior portion of the inner lip, and the operculum differs, being paucispiral with nucleus small and basal.

Monterissa gowerensis, *sp. nov.*

(Plate xviii., fig. 1.)

Shell minute, turbinate, brownish yellow, imperforate, whorls four, rounded, sutures deep, last whorl large, mouth oval, outer lip thin, columella slanting, inner lip reflected, as a pad covering the umbilicus at every stage of life. Length, 2.25 mm.; breadth, 1.75 mm.

Family Realiidae (Omphalotropidae, Olim).

The details concerning this alteration have been given in this Journal (Vol. x., p. 59, December 19, 1941). Species referable occur commonly on this island and Norfolk Island, and are very different in appearance, so that four genera are here distinguished.

Genus Duritropis, *nov.* Shell small, conical, apical whorls smooth, turbinate, later whorls sculptured with longitudinal wavy ribs, suture impressed, whorls convex, strong peripheral keel with pronounced umbilical keel, umbilical area large, umbilicus narrow, operculum paucispiral, horny.

Type, *O. brenchleyi*, Sykes. Norfolk Island.

Genus Telmosena, *nov.* Shell small, acutely conical (awl-shaped), apical whorls smooth, dome-shaped, later whorls smooth, suture lightly impressed, whorls little convex, no peripheral keel, umbilical keel strong, umbilical area very small, perforation obsolete, operculum normal.

Type, *O. suteri*, Sykes. Norfolk Island.

Genus Opinorelia, *nov.* Shell smaller than preceding, stoutly conical, apical whorls smooth, turbinate, a little elevated, later whorls smoothish, with fine concentric threads, suture deep, peripheral keel obsolete on last whorl, but sometimes recognisable on earlier ones, umbilical area large without keel, and only small perforation, operculum normal.

Type, *O. howeinsulae*, nov. Lord Howe Island.

Genus Limborelia, *nov.* Shell much larger than any of the above, acutely conical, last whorl broad, apical whorls flattened, dome-shaped, smooth, later whorls with very fine spiral threads, suture lightly impressed, whorls little convex, peripheral keel well marked, umbilical area large, bounded by strong keel, umbilicus narrow, operculum paucispiral.

Type, *Hydrocena exquisita* Pfeiffer. Lord Howe Island.

Obviously the two Lord Howe Island forms are quite unlike the two Norfolk Island ones, and indicate different origin and development.

Genus Opinorelia, *supra.*

This puzzling form recalls the succeeding in some ways, but disagrees

in others; the very rounded last whorl without keel, and the lack also of the circumbilical keel, separate it at sight, while the curious sculpture is also distinctive, but the form of the mouth is very similar.

OPINORELIA HOWEINSULAE, *sp. nov.*

(Plate xviii., fig. 2.)

Shell small, conico-turbinate, whorls very rounded, dark brown. Apex of one and a half whorls, smooth, suture canaliculate, adult whorls five with deep sutures, smooth with distant concentric slight fringed striae, the striae interrupted by growth periods, ten striae on penultimate, twenty on last whorl, mouth suboval, outer lip circular, thin, columella short slanting concealing the umbilicus which is very small.

Height, 4 mm.; breadth, 3 mm.

Type locality: The Lowlands, among palm trees.

This seems to be a form of the lowlands, specimens from the top of Mount Lidgbird, being apparently larger and broader, measuring 5.5 mm. by 4.5 mm., and may be called *O. h. belli*, subsp. nov. In some specimens there is a thread running from the anterior end of the inner lip into the umbilicus, but this is not always distinct.

Genus LIMBORELIA, *supra.*

The acute spire, flattened whorls, swollen body whorl, keeled periphery, small umbilicus, with circumbilical keel, separate the type widely from the preceding.

LIMBRORELIA EXQUISITA, Pfeiffer.

Hydrocena exquisita Pfeiffer, Proc. Zool. Soc. (Lond.), 1854, p. 307, May 8, 1855. Lord Howe Island (McGillivray).

Omphalotropis pfeifferi Crosse, Journ. de Conch., Vol. xvi., p. 178, April 1, 1868. "Lord Howe Island, New Hebrides." Figured, next volume (Vol. xvii.), pl. xii., fig. 7, April 1, 1869.

The descriptions show that these refer to the same species, apparently the incorrect locality misleading Crosse. It is the common Lowland form, and has not been received from the mountain tops, where its place appears to be taken by the succeeding.

LIMBORELIA INNESI, *sp. nov.*

(Plate xviii., fig. 3.)

Shell smaller than the preceding, and easily separated by the shouldered whorls. Shell small, stoutly conical, dark brown, whorls six with one and a half apical whorls, which appear smooth; adult whorls sculptured with very fine close concentric thread lines, suture very deep, each whorl showing a notable shoulder. Peripheral keel pronounced, circumbilical keel present, umbilicus small, half hidden by the columella, which is perpendicular. Height, 4 mm.; breadth, 2.25 mm.

Abundant on Black Face, Mt. Lidgbird.

On the top of Mt. Gower this form occurs, but the shouldering is less pronounced, and the circumbilical keel becomes obsolete. This may be called *L. i. adjuncta* subsp. nov. Specimens from the top of Mt. Lidgbird agree better with this, than with the lower typical form.

It may be noted that Hedley figured (Rec. Austr. Mus., Vol. i., p. 143, pl. xxi., fig. 8, 1891), a shell as *Realia exquisita* (Pfr.), which looks like this, but the shell labelled as original is a smooth unkeeled shell. He used *O. pfeifferi* Crosse, for the true *exquisita*.

Family Diplommatinidae.

This family of small operculate snails shows an extraordinary representation, the number of species being abnormal and apparently never-ending. Denis Macdonald reported that he had collected three species in 1852, and Macgillivray, the year later, was credited with four, but this number included two erroneously localised. When the Museum Expedition of 1887 only reported two, Hedley only recorded two, but noted that many varieties apparently existed. Upon examination, the material has yielded seven forms, and about double that number is here recorded as a basis only. There was discussion at the introduction of the first genus, *Diplommatina*, as to whether it were operculiferous or not. It seems to have been overlooked that Denis Macdonald definitely stated that some of the Fijian species lacked entirely an operculum. Semper noted that the operculum of Pelew Island species was so small that he had difficulty in finding it, while Gassie's also observed that the New Caledonian species had a very small operculum. In the multitude of Lord Howe Island shells I have handled I have failed to catch sight of a single operculum. Perhaps, as Denis Macdonald concluded, we are here confronted with the anomaly of a non-operculiferous operculate, though the Norfolk Island species have a large notable operculum as he figured in the Ann. Mag. Nat. Hist., Ser. 4, Vol. iv., p. 78, pl. iv., August 1, 1869.

Genus Palaina, Semper.

In the Journ. de Conch., Vol. xiii., p. 289, July 1, 1865, O. Semper wrote a "Notice preliminaire sur le famille des Diplommatinacées," and on pp. 290-91 recorded that "H. & A. Adams had separated *Arinia* and *Paxillus*, and Martens, *Diancta*." To these he would add a fourth, consisting of a series of new species, and including some from Australia. This group he named *Palaina*, and gave a list of fifteen undescribed new species, and *macgillivrayi* Pfr., and *capillacea* Pfr. The two last are the only ones identifiable, and I designate *macgillivrayi* Pfr., as type of *Palaina*. This is necessary as Thiele, apparently following Kobelt and Mollendorff, has given *patula* Crosse, as example.

The true *Palaina*, as developed on Lord Howe Island, includes sinistral shells, varying from 1.5 mm. to 6 mm. in length, the largest being the typical *macgillivrayi*. The apex is small, turbinate, and smooth, the adult whorls descending rapidly, the juvenile being a conical openly perforate shell, the fourth or fifth whorl ascending a little, closing entirely the umbilical area, and forming a more or less circular mouth with expanded lip closely appressed to the body whorl. Operculum so far not seen, if present at all. A curious feature is the change of sculpture seen on last whorl just above the aperture, where a depression is noted in which the sculpture is much finer than that preceding and succeeding it.

Four species were credited in early accounts, *macgillivrayi*, *capillacea*, *chordata* and *cantori*. The two first-named are undoubtedly native, but the third was described as from New Zealand, collected by Strange, with a variety from Lord Howe Island. The description shows this to be the New South Wales species, collected by Strange, and simultaneously described by

Benson and A. Adams, and nothing much like this occurs on the island. The fourth was named as from Lord Howe Island, New Hebrides, and the description is of a small shell, 2 mm. by 1 mm., with an acute apex, which no local shell possesses, so that it must be looked for at the other Lord Howe Island.

The Norfolk Island forms may be here diagnosed as PALMATINA, *gen. nov.* Shell small, up to 3.5 mm., elongate, apex a little elevated, sinistral, sculpture of erect sharp longitudinal lamellae, last whorl completely rounded, aperture circular, almost free, mouth duplicate, operculum circular, large, filling mouth. Type, *D. coxi,* H. Adams.

The Lord Howe Island species can be separated into three size groups, large, medium and small to minute. While there may not be any additions to the two first groups, many may be added in the last. The species appear to occur in local colonies, and also restricted in range, so that a great deal of study is still necessary.

PALAINA MACGILLIVRAYI, Pfeiffer.

(Plate xviii., fig. 16.)

Diplommatina macgillivrayi Pfeiffer, Proc. Zool. Soc. (Lond.), 1854, p. 303, May 8, 1855. Lord Howe Island.

Described as measuring 6 mm. by 3 mm., with six whorls, including two apex, the next two distantly costulate, the penultimate very broad, closely costulate, the last whorl very closely costulate. This is a good description of the common Lowlands form. On account of the longitudinal sculpture varying on the whorls, I am giving the number of ribs seen in front view as illustrated, for easy determination. Coloration pink and cream, the latter showing as a band on last whorl. Shell turreted, imperforate, swollen medially, mouth a little irregular, the left side showing a blunt corner, whorls convex, sutures deep, the apex consisting of one and a half whorls smooth, sometimes faintly radially striate, the first adult whorl showing on the face nine lirae, with longitudinal threads between, next whorl twelve, the next fifteen, the last twenty. The juvenile openly perforate, conical, showing spiral concentric striae on the early whorls.

A distinct form is named

P. MACGILLIVRAYI SEMILEVIS, *subsp. nov.*

This may later be determined as specifically separable as in certain localities it only occurs, and when found mixed with the preceding a size-differentiation appears. The specimen figured and described, plate xviii., fig. 12, is from North Bay, whence a uniform series was sent.

Shell large, of same form as the type, but whorls less convex and sutures shallow; the distant lirae of the early whorls disappear on the later whorls, which are very finely striate only. Using the formula above noted, the first whorl and half smooth, the next nine lirae, succeeding nine, the penultimate seven stronger, twenty weak threads, with the last about forty-five.

Common also on the North Ridge, Boat Harbour, and the foot of Mt. Gower.

From the heights of Mt. Gower another form is named

P. MACGILLIVRAYI PUSILLIOR, *subsp. nov.*

This is figured (pl. xviii., fig. 17), and again may prove a distinct species. It is smaller, measuring 4 mm. by 2.5 mm., with more regular, coarser sculpture, whorls convex, sutures deep, not so swollen as the type, the apical one and a half smooth, next ten, third twelve, fourth twelve and last with seven lirae, then twelve fine threads in depression, and five lirae. It may be pointed out that the back of the last whorl shows a succession of close regular fine lirae.

PALAINA CAPILLACEA, Pfeiffer.

(Plate xviii., fig. 8.)

Diplommatina capillacea Pfeiffer, Proc. Zool. Soc. (Lond.), 1854, p. 303, May 8, 1855. Lord Howe Island.

This was described as 5 mm. by 2-2/3rd mm., "capillaceo-striata."

The Lowland shell answering to this description is differently built from the preceding, the whorls increasing more regularly, with no medial swelling. Shell creamy white, rarely pink, turreted, whorls convex, sutures deep, apex of one and a half whorls, dome-shaped, smooth, first adult whorl showing rather distant threads, twelve in number, next with eighteen, third with twenty-two, the last showing nine, the depression very finely threaded, with twelve on right side. The specimen figured is an immature from "Near the Pines, under sticks on ground," but in the adult the mouth is thickened and subcircular.

A series from Goat Island is composed of smaller shells with more numerous but still distinct threads, and may be named

P. CAPILLACEA DEFINITA, *subsp. nov.*

The figured type shell (plate xix, fig. 3) measures 4 mm. by 2 mm., and the first whorl and a half are smooth, a little elevated, the first adult whorl showing fifteen threads, the next twenty-one, the next thirty, the last nine, medially too fine to count easily, right side half a dozen.

This is the first mention in this essay of Goat (or Rabbit) Island as a locality providing local differentiation, but it has a long history, though it is a mere rocky islet on the reef edge of the lagoon. Yet from it has been described *Placostylus cuniculinsulae* Cox, *Nanina sophiae* var. *conica* Hedley, and *Helix catletti* Brazier, all of which will be treated later.

PALAINA LEVICOSTULATA, *sp. nov.*

(Plate xviii., fig. 13.)

Recalling *capillacea* in form, but with the whorls less convex and the sutures shallow, the sculpture is completely reduced to a threading so fine that the threads are not worth counting. The apex is very finely radially striate, and the type from the North Ridges measures 5 mm. by 2.5 mm. It is perhaps the second commonest Lowland form, and, while the adult is usually white, the immature is horny in appearance, and does not show the open perforation of *macgillivrayi*, though still perforate. This completes the series of larger shells.

PALAINA NICHOLSAE, *sp. nov.*

(Plate xviii., fig. 9.)

Shell smaller, more regular in form, whorls convex, sutures deep, some-

with the first whorl and a half dome-shaped smooth, next whorl, first what regular lirate throughout. The type measures 3.5 mm. by 1.75 mm., adult, broad with fifteen lirae, next two eighteen to twenty each, last 8 on left, twelve finer in depression, and eight on right, the mouth more circular. Common on the Lowlands, Old Settlement, North Ridge, and also Boat Harbour.

This is probably the form recorded under *chordata*.

PALAINA HOWEINSULAE, *sp. nov.*

(Plate xviii., fig. 10.)

Shell a little larger than the preceding, bulkier in build and with coarser sculpture, mouth larger, less rounded, measuring 4 mm. by 2.25 mm. The first whorl and a half are smooth, forming the dome-shaped apex; next whorl broad but shallow in depth with nine lirae; next ten, third twelve, last with sixteen finer but distinct on depression. Equally common on the Lowlands with the preceding.

PALAINA WATERHOUSEI, *sp. nov.*

(Plate xviii., fig. 11.)

Smaller and pure white, whorls convex, sutures deep, measuring 3 mm. by 1.5 mm. The apex of one and a half whorls, smooth, is very small, almost immersed in the first adult whorl, which is broad, with nine distant lirae between which fine concentric striae can be distinguished; the next whorl has also nine or ten, third with twelve, the last showing twenty finer lirae, the concentric striae being now obsolete, mouth circular.

Near the Pines under sticks, also North Ridge and Boat Harbour. May be widely distributed, but not easily collected on account of small size, which remark applies to all the smallest forms.

PALAINA EDWARDI, *sp. nov.*

(Plate xviii., fig. 14.)

This is a shell of the same size, 3 mm. by 1.5 mm., from Mount Lidgbird, a little different from the preceding in form with coarser sculpture. The smooth apical whorls are not immersed, and the first adult whorl shows only five lirae with concentric striae between, the next only seven, the third ten, and the last fifteen, the mouth circular. A similar looking shell measuring 2.75 mm. by 1.5 mm. shows the same number of lirae on the first two adult whorls, but one or two fewer on the third whorl and more on the last, three or four on the left side, ten finer medial ones, and four or five dextrally. This comes from Boat Harbour, and may be called *P. reta* nov.; it may be a subspecies of a widely spread form, or it may be a distinct species.

PALAINA DELICIOSA, *sp. nov.*

(Plate xviii., fig. 15.)

Shell minute, white, whorls very convex, sutures very deep. The first whorl and a half are dome-shaped, smooth, the first adult whorl very swollen, deep, with twelve weak riblets, next even more swollen with fifteen distant riblets, the interstices concentrically striate, the last five, median depression practically smooth, then five more riblets on the right, mouth circular. Length, 1.5 mm.; breadth, 1 mm.

From near the top of Mt. Lidgbird.

PALAINA PADDA, *sp. nov.*

(Plate xix., fig. 1.)

Shell minute, white, whorls slightly convex, sutures deep. Apical whorl and a half, smooth elevated, first adult twenty close lirae, next twelve more distant, last six lirae, then smoothish depression and five dextral lirae. Mouth circular, spreading on face of body whorl, back of which is regularly lirate. Length, 2 mm.; breadth, 1.1 mm.

From North Ridge.

PALAINA LUCIA, *sp. nov.*

(Plate xix., fig. 2.)

Shell small, red with white band, coloration of largest species, but more regular in form. Apical whorl and a half dome-shaped, smooth, first adult whorl with heavy distant ribs longitudinally, about seven in number on face, next with same number, third with ten, last with six, ten, fine on medial depression, then four dextrally, mouth small, circular, appressed.

Length, 3 mm.; breadth, 1.75 mm.

From top of Mt. Gower.

PALAINA EMBRA, *sp. nov.*

(Plate xix., fig. 4.)

Shell minute, white, regular in form, finely sculptured. Apical whorl and a half, dome-shaped, smooth, next three swollen of about same width. On face of first adult whorl, twelve to fourteen ribs may be counted, next eighteen to twenty, last five or six, smoothish medial depression, then dextrally half a dozen, mouth small, circular, appressed to body of preceding whorl.

Length, 1.5 mm.; breadth, .75 mm.

From top of Mt. Gower.

Subclass PULMONATA.

Order STYLOMMATOPHORA.

Family ELASMATINIDAE.

Genus ELASMIAS, Pilsbry.

Elasmias Pilsbry, Nautilus, Vol. xxiii., p. 122, March, 1910.

Orthotype, *Tornatellina aperta*, Pease.

ELASMIAS SCHOLA, *sp. nov.*

(Plate xviii., fig. 5.)

Hedley misidentified this species as Brazier's *Tornatellina inconspicua*, and determined my Kermadec Island specimens as identical, and I used the name in my report. I sent my shells with my notes to Pilsbry, who was monographing the family. Pilsbry introduced the generic name, and admitted many species, including as Polynesian,

E. ovatum Anton. Opara = Austral Group. Size, 3½ mm. by 2½ mm.

E. ovatum apertum Pease. Tahiti. Size, 3½ mm. by 2½ mm.

Thereunder he ranked the Kermadec shells, without differentiation, figuring a specimen, 4.5 mm. by 2.6 mm. on pl. 30, figs. 4-5.

E. peaseanum Garrett. Society Islands. Size, 5 mm. by 2½ mm.

From Australia, New Guinea and New Caledonia Pilsbry catalogued

E. wakefieldae Cox. Clarence River, N.S.W. Size, 2.5 mm. by 2.1 mm.

E. mariei Crosse. New Caledonia. Size, 2.5 mm. by 2 mm.

Obviously the Kermadec shell should have been named, as it was larger and differently shaped, so it is here called *E. connisum,* sp. nov.

The Lord Howe Island specimens are large, measuring 3.5 mm. by 2.75 mm., not as large as the Kermadec species, but much larger than the New Caledonian *E. mariei,* which seems juvenile, but the juvenile of the Lord Howe Island species of the same height, 2.5 mm., is broader, with a weaker parietal and more acute columellar teeth. The shell is horny in coloration. On Lord Howe Island specimens were only found on leaves of trees near the school-house, and at the Kermadecs the genus was only found on Kawa (Pepper) plants near a deserted cultivation. As it seems to be found in similar situations throughout its range, this fact suggests that it is a vagrant.

Genus TORNELASMIAS, *nov.*

Type, *T. capricorni,* nov.

The genus *Tornatellinops* was introduced for elongate species with a sinuate columella, but bearing no columellar tooth at any stage of growth. The Lord Howe Island species are very similar in the adult stage, but the juveniles show columellar teeth. This would place them nearer *Elasmatina,* but they cannot be placed under that genus.

TORNELASMIAS CAPRICORNI, *sp. nov.*

(Plate xviii., figs. 6, 6a.)

Shell elongate, very small, imperforate, whorls slightly convex, sutures little impressed, mouth small, outer lip thin, columella twisted, coloration brown. Whorls five and a half, the apex a little conical, sculpture of radial growth lines only. The very juvenile figured (fig. 6a) shows a columellar tooth.

Length of adult, 4 mm.; breadth, 1.5 mm.

Goat (or Rabbit) Island.

TORNELASMIAS INCONSPICUUM, Brazier.

(Plate xviii., fig. 7.)

Tornatellina inconspicua Brazier, Proc. Zool. Soc. (Lond.), 1872, p. 619, November 3. Lord Howe Island (Coll. Australian Museum, collected by G. Masters).

The original description was copied by Pilsbry and placed under *Tornatellinops,* with reservation, as the type was destroyed and the juvenile stages unknown. Length, 1 line by ½ line; aperture: length, ½ line.

Bell collected a series from crevices of wood near the Pines on the Lowlands, and this is regarded as the lost species and figured as such. It agrees in dimensions and juveniles show a columellar tooth.

TORNELASMIAS LIDGBIRDENSE, *sp. nov.*

(Plate xviii., fig. 4.)

Shell imperforate, comparatively broader than the Lowland forms, and the juveniles show the columellar tooth to a later stage more noticeably. The whorls are five, the apex more sharply dome-shaped, the whorls more

convex, sutures deeper than in preceding. The parietal is much more prominent, and the twisted columella shows a duplex toothing at some stages, which is puzzling at first. The type measures 3.25 mm. by 1.75 mm., but larger specimens occur at some places. Collected on the Black Face of Mount Lidgbird, and elsewhere in the heights.

Family Placostylidae.

Genus Placostylus.

Placostylus Beck, Index Mollus, p. 57, 1837. Haplotype, *P. bootis,* Menke.

Based on a New Caledonian shell, this genus and family is well developed in that island, but the Lord Howe Island species, first-named, is very like the type of the genus in detail. Three forms have been named and, had they come from different places, they might have been placed in different genera so unlike at first sight they appear.

Placostylus bivaricosus, Gaskoin.

Bulimus bivaricosus Gaskion, Proc. Zool. Soc. (Lond.), 1854, p. 152, Moll., pl. xxix., figs. 4-5, April 11, 1855. Lord Howe Island.

This fine shell, apparently collected by J. Macgillivray, measured 2-3/10th in. by 1 in., reddish in colour, with a heavy lipped mouth. Later, a small form with a thin lipped mouth, measuring 1.65 in. by .75 in. from Rabbit (or Goat) Island, was named as a distinct species, *cuniculinsulae.* The Museum Expedition of 1887 collected specimens, including subfossils, and Etheridge named the latter as var. *solida,* but a very large form, with a thin lip, was figured on plate v., figs. 1, 2, 7, 8, under the name *Bulimus (Eurytus) etheridgei* Brazier. This was not mentioned in the text. The figures measure 65-70 mm. by 27-29 mm., and show the outer lip thin and the inner lip only slightly thickened.

Hedley gives its coloration as "nearly black," and its locality "under the wall of Mt. Lidgbird," reducing it to a variety only of the typical *bivaricosus* of which he gave the radula formula as 127 x 35.22.1.22.35.

The variation in this group is worthy of study, but there is the new difficulty of recent years, the destruction effected by the rat plague, written up by Hindwood. At the present time the various forms may be less visible in the field than in Roy Bell's time, when he indicated no less than six different colonies, separable in the field. The most spectacular was the large form found on the Little Slope of Mt. Gower, which was named *royi,* but which is very close to *etheridgei,* apparently from the saddle of Mt. Lidgbird. This (*royi*) ranges larger than *etheridgei,* 80 mm. by 40 mm., against *etheridgei's* 65 mm. by 27 mm., and differs in the red-brown coloration, the thickened lips, and the locality, Little Slope of Mt. Gower. Apparently the colonies breed true, and the immature are separable, according to Roy Bell's account and series, which he forwarded.

A small form from the mainland recalling *cuniculinsulae,* but with a thickened mouth, the dead equivalent of *solida,* was named *belli,* as the specimen measures 56 mm. by 23 mm., the apex large, dead shell white, no ripple markings, only rough growth lines, mouth thickened, outer lip showing weak posterior notch and deep anterior sub-channel, columella twist strong, inner lip heavily callused. Although Pilsbry wrote for the type of *Placostylus,* "embryonic whorls thimble punctate," this is not so in this group, as the juvenile consists of three whorls, wrinkly striate sculpture,

with columella folded. The apex of the N.Z. *shongii* has fine lines regularly, not wrinkly, striate.

PLACOSTYLUS CUNICULINSULAE, COX.

Bulimus (*Placostylus*) *cuniculinsulae* Cox, Proc. Zool. Soc. (Lond.), 1872, p. 19, pl. iv., fig. 3, June. Rabbit Island, near Lord Howe Island.

The name was written *cuniculoides,* in the Museum Report (a curious slip).

This slight shell measured 42 mm. by 20 mm., and the mouth is not thickened at all, a somewhat remarkable evolution.

Family PARALAOMIDAE.

The minute shells belonging to this family appear to be widely spread throughout Australia, and many species are here introduced from Lord Howe Island, some very like the Kermadec typical species. While most are referable to the original *Paralaoma* type, some differ in form and sculpture, and these have been referred to *Allenella,* a genus defined hereafter.

Genus PARALAOMA, Iredale.

Paralaoma Iredale, Proc. Mal. Soc. (Lond.), Vol. x., p. 380, September, 1913. Haplotype, *Paralaoma raoulensis,* Iredale.

PARALAOMA ROYI, *sp. nov.*

(Plate xix., fig. 7.)

Shell minute, depressedly turbinate, spire a little elevated, whorls few, rounded, sutures impressed, widely umbilicate, mouth subcircular, lip thin, columella slightly reflected. Coloration pale brown. Apex one and a half whorls, smooth. Sculpture of dense fine riblets, distinct. Breadth, 1.5 by .75 mm. From near the Pines on the Lowlands. Some shells go larger, reaching 2 by 1.25 mm., the last whorl descending a little.

PARALAOMA INNESI, *sp. nov.*

(Plate xix., fig. 11.)

Shell minute, depressedly turbinate, whorls rounded, sutures deep, widely umbilicate, columella straight, mouth squarish, lip thin. Coloration dark fawn. Apex of one and a half whorls, smooth. Sculpture of fine distinct radials very closely packed. Umbilicus wide, but narrower than in preceding, which occupies about one-third of the breadth of the whorl, and this only one-fifth. Breadth, 1.75 mm.; height, .75 mm. Heights of Mt. Lidgbird.

PARALAOMA COMPAR, *sp. nov.*

(Plate xix., fig. 13.)

Shell small, depressedly turbinate, whorls rounded, sutures deep, umbilicus broad, columella slanting, reflected, mouth roundish. Coloration blackish brown. Apex large, smoothish. Sculpture of strong radials with fine concentric striae between, the latter more noticeable on the base. Umbilicus wide, about one-fifth the width of the base, which is rounded. Breadth, 2.5 mm.; height, 1 mm. Heights of Mt. Lidgbird.

The same, or an allied form, also occurs on the top of Mt. Gower.

PARALAOMA GOWERI, *sp. nov.*

Shell minute, depressedly turbinate, whorls rounded, sutures impressed,

spire a little elevated, umbilicus broad, columella slanting, reflected, mouth large, rounded, as high as broad, lip thin. Coloration brown. Apex large, smooth. Sculpture of fine radial threads, close together but distinct, a very slight concentric striation seen on the base. Umbilicus broad, but only about one-fifth of the breadth of the shell. Breadth, 1.75 mm.; height, 1 mm. Mt. Gower on the heights.

PARALAOMA LIDGBIRDENSIS, *sp. nov.*

(Plate xix., fig. 12.)

Shell minute, depressedly turbinate, spire a little elevated, whorls rounded, sutures well marked, periphery lightly keeled, columella a little sloping, reflected, mouth broader than high, lip thin, umbilicus very small. Coloration pale fawn. Apex large, smooth. Sculpture of very fine radials, separate and distinct, with a still finer interstitial concentric striation, better seen on the base. Breadth, 1.75 mm.; height, .75 mm. Mt. Lidgbird, near the top.

This minute species is not a typical *Paralaoma*, neither is it an *Allenella*, as the apex is smooth, and the umbilicus is even smaller, while the sculpture recalls that of *Paralaoma*, a new subgenus, *Semilaoma*, with *P. abjecta* Iredale, as type, is therefore introduced.

PARALAOMA ABJECTA, *sp. nov.*

(Plate xix., fig. 10.)

Very like the preceding in most details, the sculpture finer, no concentric striation notable, spire a little more elevated, mouth a little more rounded, scarcely any broader than high, the keel more pronounced, especially on the earlier whorls. Coloration pale greenish. Breadth, 1.5 mm.; height, .75 mm. Type from Transit Hill. A large series from near the Pines.

Genus ALLENELLA, *nov.*

Type, *A. formalis*, nov.

Distinctive in form, more conical than preceding, with different sculpture, small umbilicus, and apical whorls spirally striate.

This may not be accurately referable to this family, and I was inclined to suggest that anatomical investigation would settle the matter, but after study of many anatomical papers, I am fain to deny that they can help much when they have no assistance from shell characters.

ALLENELLA FORMALIS, *sp. nov.*

(Plate xix., fig. 9.)

Shell small, conico-turbinate, spire elevated, whorls only slightly rounded, sutures lightly impressed, periphery keeled, base rounded, umbilicus small, deep, mouth large, subcircular, lip thin, columella straight, reflected. Coloration rich brown. Apex of one and a half whorls spirally striate. Sculpture of very fine, microscopic, radial striae faintly decussate by concentric microstriation, these more prominent on the base, the radials there obsolete. Umbilicus small, about one-seventh diameter of base. Height, 2.75 mm.; breadth, 3.5 mm. Heights of Mt. Lidgbird.

A specimen from Mutton Bird Point, on the Lowlands, measures 3.25 in breadth by 2.5 mm. in height, and is more finely sculptured above and

more notably concentrically striate below, representing a new subspecies, *A. f. planorum,* subsp. nov.

ALLENELLA BELLI, *sp. nov.*

(Plate xix., fig. 5.)

Shell small, depressedly turbinate, spire little elevated, whorls rounded, sutures deep, periphery rounded, umbilicus small deep, mouth large, high as broad, columella reflected. Coloration dark brown. Apex of one and a half whorls, spirally striate. Sculpture of very fine radial striae, the decussation scarcely notable, though present, and the radials continue on to the base, with the concentric striae still more obsolete. Breadth, 2.5 mm.; height, 1 mm. Heights of Mt. Gower.

A larger form, 3.25 mm. by 1.5 mm., from the heights of Mt. Lidgbird, is more elevated, subkeeled, sculpture of radials stronger, more pronounced on the base, and may be called *A. b. extra* subsp. nov., and is figured, pl. xix., fig. 6.

Family PSEUDOCHAROPIDAE.

An extraordinary development of beautiful small shells is indicated by this family name. When the first members were discovered they were introduced under *Helix,* but were figured as *Helix (Rhytida).* This indicates the Rhytidoid appearance. When Hedley examined the animals he transferred them to *Patula,* the name then used for "Endodonts" in the widest sense. Obviously they have little real relationship with true "Endodonts," and I was thinking of allotting them to the Flammulinidae, which they slightly resemble. The type, *Flammulina,* is however just as different, so that to save further confusion the above name is utilised.

Shells more or less loosely coiled, whorls few, last very large, sculpture of apex radials, adult sculpture radial ribs, mouth transverse, large. The typical *Pseudocharopa* agrees least with the general description given. An intricate maze of illustration, definition and nomination surrounds the species, and the history must be given.

The first account is by Etheridge (p. 26): "On the eastern flanks and spurs of Mount Lidgbird we collected a small *Helix,* at a height of 800-900 ft., which Mr. Brazier proposes to call *Helix Lidgbirdi.* It is a pretty little turreted and variegated shell, and may be found crawling on the basaltic boulders and blocks strewn over the flanks of this inaccessible hill, but in dry weather it takes refuge in the large vesicular cavities of the basalt." A couple of paragraphs later, the text reads: "The humid gullies and moist hill flanks, running from the North Ridge to the Old Settlement, afforded a prolific hunting ground. There, amid loam, decaying wood, and under stones, were obtained numbers of small Helices, which Mr. Brazier proposes to designate *H. Whiteleggei;* a very finely but regularly transversely striated species, *H. Balli,* a rare form."

Such is the introduction of the names, and at this place *H. lidgbirdi* is a recognisable form, *H. whiteleggei* is a *nomen nudum,* and *H. balli* may be later determined. Now to complicate matters plates were included purporting to give illustrations of these species, and unfortunately the crude lithographic attempts were reversed.

Plate iv., figs. 19, 20, are named *Helix (Rhytida) Lidgbirdi* Brazier, and these show the upper and underside only, of a striated unicolor shell,

measuring 18 mm. across. These obviously do not refer to the shell above described.

Plate iv., figs. 23, 24, 25, named *Helix (Rhytida) Whiteleggei* Brazier, are of a large variegated shell, an elevated spire, marked radial striae, small umbilicus, rounded mouth, not entire, shell measuring 11 mm. by 7 mm. The shell so named to-day has a flattened spire not much like this figure.

Plate iv., figs. 13, 14, 26, named *Helix (Rhytida) Balli* Brazier. This is a smaller shell with a higher spire, coarser sculpture, free mouth, unicolor, measuring 8.5 mm. by 6 mm. These figures are nothing like the shell so-called to-day, but agree better in form, but not in colour, with the description of *lidgbirdi*. It should be noted that the locality given for the last two is the North Ridge.

Hedley a little later wrote up the Museum Expedition material, using Brazier's names, with the generic name *Patula*, and giving descriptions, but did not offer further illustrations. Unskilled in conchological work at that date, being more interested in anatomical details, Hedley reduced the three species to one, selecting the name *whiteleggei*, and recording the others, *balli* and *lidgbirdi*, as varieties only. The localities were amended (?) to "Summit of Mount Lidgbird" for *whiteleggei* and *balli*, and "western" flanks of the same mountain for *lidgbirdi*. The members of the Expedition did not reach the summit of Mt. Lidgbird, only attaining the low saddle, while "eastern" not "western" flanks were given for *lidgbirdi*. Then, *whiteleggei* is described as chestnut painted with zigzag flames, measuring 16 mm. by 6 mm., *balli*, no colour given, 11 mm. by 6 mm., and *lidgbirdi*, no colour given, globosely conoid, spire elevated, aperture subcircular, measuring 8 mm. by 6 mm.

The following year Pilsbry copied the figures, reversing them, so that they showed correctly, but added a new figure from a specimen, sent by Dr. Cox, of *whiteleggei*.

Some years ago Peile examined the material at the British Museum, and made comments which are not of much value, as he was more interested in radulae than in shells. He accepted the names as of Hedley, and added a fourth species, ex Preston MS., and proposed the new generic name, *Pseudocharopa*, with *lidgbirdi* Hedley, as type, rejecting Preston's *Howeinsulea* (sic), and nominating *lidgbirdi* as its type (which was not Preston's idea at all).

After discussing vaguely some Lord Howe Island shells, Peile wrote: "I propose for some of these forms the name *Pseudocharopa* gen. nov., in which the shells are perforate with rapidly increasing whorls sculptured with more or less prominent radial costae with fine radial striae in the intervals. Species: *lidgbirdi* Hedley, genotype (pl. XVIIB, fig. 1); *balli* Hedley (pl. XVIIB, fig. 2); *whiteleggei* Hedley, and *exquisita* described below." From a superficial examination of the radulae Peile suggested *Monomphalus*, a very unlike New Caledonian shell, as perhaps related, and apparently he would include *"Endodonta" waterhousiae* Hedley, in the medley. He wrote: "The apical sculpture of these shells requires investigation. *Monomphalus* has very minute spirals on the first whorl, so has *E. waterhousiae*, fide Hedley. I have been unable to find spirals in specimens available of other species, probably because of erosion."

What is meant by "other species" is problematical. He explained: "I have examined radulae of *balli* and *lidgbirdi*, and find them in good agree-

ment with Hedley's figure of *whiteleggei*. The formula of the former is 27.1.27."

Then he figured the radula of *exquisita* with formula 21.1.21.

We are now confronted with the usage of the names already proposed, and there are four distinct series, and it is now impossible to determine exactly all the shells mentioned in Etheridge's report. *H. lidgbirdi* is the only one that can be exactly determined, as a shell answering to the description is common at the locality indicated. However, the illustrations in the Report under this name are not referable, the figures allotted to *balli* having been drawn from specimens of *lidgbirdi*, and Hedley's description also applies.

H. whiteleggei, fully described by Hedley and figured by Pilsbry, is the well-known *whiteleggei*, but it does not agree with the figures in the Museum Report, which however are crude, but Etheridge did not describe it. Then Hedley's locality is quite wrong, and Etheridge's should be right.

As to *H. balli*, this seems quite indeterminable from Etheridge's account and figures, and Hedley's reference again to the "Summit of Mt. Lidgbird" does not help matters, so this name should be discarded entirely. It may be noted that Peile's figure, named *balli*, is of a shell from the mountain heights, the top of Mt. Gower, which the Museum Expedition did not reach, and was named *imperator*. More collecting must be done to find out if *"whiteleggei"* and *"balli"* exist on the North Ridge. The above recapitulation is necessary, but whether it will be studied by extralimital workers is very doubtful, as most recent incursions into Australian conchology by such have been notable for their lack of contemporary local literature.

Genus Pseudocharopa, Peile.

Pseudocharopa Peile, Proc. Mal. Soc. (Lond.), Vol. xviii., p. 267, November 15, 1929. Orthotype, *Helix lidgbirdi*, Hedley.

Howeinsulea Peile, ibid., same type, ex Preston MS.

As introduced by Peile for "some species" naming four, with *"lidgbirdi* Hedley" designated as type, it was based on radular characters, shell characters being subordinate, yet he did not give any details of the radula of the selected type. His grouping was very general as each species differs.

The type, *lidgbirdi*, as here accepted is the smallest of the series he named, the most elevated, the whorls most convex and the mouth almost circular and free. The radula formula was not given.

The largest species, figured as *whiteleggei* by Pilsbry, has the spire flattened, the whorls little convex showing a slight depression above the periphery, the mouth very large and oval, broader than high and quite discontinuous. The radula formula was given by Hedley as 150 x 21.10.1.10.21. Obviously this does not agree completely with the preceding, and the subgeneric name *Deceptrena* is introduced, with *editior* infra as type.

Next in size is the species figured by Peile as *"balli,"* but which was named *imperator* from the top of Mt. Gower. The spire is convex, the whorls flattened, showing no anteperipheral depression, the mouth large, less expanded than the preceding, deeper, discontinuous, sculpture finer, with radula formula according to Peile of 27.1.27, but no details given, and represents another subgenus, *Ballena*, nov., with *imperator* as type.

All the preceding are more or less loosely coiled, showing an open umbilicus, with the apex smooth to radially striate and radial costae more or less strong. The fourth, named *exquisita* by Peile, is very different, and is separated generically as *Lidgbirdia*, gen. nov. The shell is smaller than the previous two, whorls a little convex, spire a little elevated, sculpture very strong of distant radials, weaker threads between, a deep anteperipheral depression, the mouth large, the umbilicus practically missing, being minute and concealed at every stage of growth. The radula formula, according to Peile, is 21.1.21, a crude figure being given.

PSEUDOCHAROPA LIDGBIRDI, Etheridge.

Helix lidgbirdi Etheridge, Aust. Mus. Mem. No. 2, p. 26, May 1, 1889, ex Brazier MS. Eastern flanks of Mt. Lidgbird, 800-900 ft. Not pl. iv., figs. 19, 20, but probably figs. 13, 14, 26, under name *H. balli*.

Patula whiteleggei var. *lidgbirdi* Hedley, Rec. Austr. Mus., Vol. i., p. 139, June 30, 1891. "The western flanks of Mt. Lidgbird."

Pseudocharopa lidgbirdi Peile, Proc. Mal. Soc. (Lond.), Vol. xviii., p. 267, pl. xvii.B., fig. 3, November 15, 1929. Lord Howe Island.

Shell small, elevated, loosely coiled, whorls very convex, sutures deep, mouth almost circular, almost free, widely umbilicate. Coloration dull grey, flame-marked with brown. The apex is elevated, one and a quarter whorls, the first whorl practically smooth, developing radials, which are more definite on the succeeding quarter, where a slight varix separates the protoconch from the adult whorls. The sculpture on these consists of distant radial ribs; the interstices longitudinally striate, twenty-five on first whorl, and only slightly packing up towards aperture. Breadth, 8 mm.; height, 6 mm. On the face of Mt. Lidgbird, 800 ft.

On the top of Mt. Gower a larger representative occurs, which is called *gowerensis*, measuring 10 mm. in breadth by 7.5 mm. in height, which is figured (Plate xx., fig. 11). In this the sculpture becomes finer, but never as fine as the succeeding *imperator*, and retains the almost free mouth and the dull coloration.

PSEUDOCHAROPA WHITELEGGEI, Brazier.

Helix whiteleggei Etheridge, Austr. Mus. Mem. No. 2, p. 26, May 1, 1889, ex Brazier MS. *Nomen nudum*. North Ridge.

Helix (Rhytida) whiteleggei Brazier, *ibid.*, pl. iv., figs. 23, 24, 25. No exact locality given.

Patula whiteleggei Hedley, Rec. Austr. Mus., Vol. i., p. 138, pl. xxi., fig. 6 (jaw), pl. xxii., fig. 1 (radula), June 30, 1891. Summit of Mt. Lidgbird.

Patula whiteleggei Pilsbry, Man. Monch. (Tryon), Ser. 2, Vol. viii., p. 106, pl. 19, figs. 53, 55, 1892. (Original from Cox specimen.) Lord Howe Island.

Hedley's excellent description and Pilsbry's figure would fix this species, though Hedley's "Summit of Mt. Lidgbird" was quite erroneous.

Shell largest of the series, flattened, spire depressed, whorls little convex, last whorl showing a slight anteperipheral depression, sutures impressed, last whorl disproportionally large, scarcely descending, mouth irregularly transversely oval, lip thin, columella a little expanded, connected by very slight glaze across body whorl, but mouth quite discontinuous.

Coloration, dull greyish with broad dark red brown flames, which soon merge so that the appearance becomes a uniform dull brown with the early whorl only bicolour. Protoconch very similar in every detail to that of the preceding; the adult sculpture consists of radial ribs a little distant on first whorl about thirty in number, interstices radially striate, last whorl completely closely radially striate. Umbilicus open but narrow. Breadth, 16 mm.; height, 6 mm.

Ranges from a few hundred feet up Mt. Lidgbird to top, and probably elsewhere at similar heights. Shells from the top of Mt. Gower do not seem to reach the same dimensions, measuring 13 mm. by 6 mm. In view of the extraordinary confusion about the name and locality, this is here named *editior* nov., and figured. (Plate xx., fig. 1.)

PSEUDOCHAROPA IMPERATOR, *sp. nov.*

(Plate xx., fig. 4.)

? *Patula whiteleggei* var. *balli* Hedley, Rec. Austr. Mus., Vol. i., p. 139, June 30, 1891. Summit of Mt. Lidgbird (erroneously). Not *Helix balli* Etheridge, Aust. Mus. Mem. No. 2, p. 26, May 1, 1889, ex Brazier MS. North Ridge. Indeterminate. Not *Helix* (*Rhytida*) *balli* Brazier, *ibid.*, pl. iv., figs. 13, 14, 26, which are *lidgbirdi*, probably figs. 19, 20 (*lidgbirdi*), which are unrecognisable.

Pseudocharopa balli Peile, Proc. Mal. Soc. (Lond.), Vol. xviii., p. 267, pl. xvii.B., fig. 2.

This beautiful species is more brightly coloured than any of the others. Shell a little smaller than the preceding, but spire a little elevated, whorls little convex, sutures impressed, last whorl large, descending, three whorls, outer lip thin, mouth large, discontinuous, oval, a little broader than high, columella straight, a little expanded, umbilicus narrow, open. Protoconch similar to that of the preceding, adult sculpture of fine thread-like radials continuing throughout the same strength to the aperture. Coloration yellowish flamed with bright red, shell seeming more liable to erosion than preceding. Breadth, 13 mm.; height, 9 mm. From the top of Mt. Gower.

In this case specimens from the top of Mt. Lidgbird are smaller, 10.5 by 6 mm., and may be called *P. i. monta*, subsp. nov.

Genus LIDGBIRDIA, *nov.*

Type, *Pseudocharopa exquisita*, Peile.

Shell differing at sight from any of the preceding members of the family in its form, sculpture and lack of open umbilicus. The intriguing feature of the shell is the medial depression in the upper whorls, while the closing of the umbilicus is characteristic, combined with the strong sculpture continuous to the edge of the mouth.

LIDGBIRDIA EXQUISITA, Peile.

Pseudocharopa exquisita Peile, Proc. Mal. Soc. (Lond.), Vol. xviii., p. 267, pl. xvii.B., fig. 3, November 15, 1929. Near summit of Mt. Lidgbird, on wet rock faces, Lord Howe Island.

Shell small, depressedly turbinate, whorls convex with a medial depression, sculpture of strong distant radial with fine radials between, mouth very large, lip thin, columella slanting, reflected, concealing the minute umbilicus. Coloration dull yellowish grey, flamed regularly with broad zig-

zag reddish brown flames. Apical whorls smooth, variced, first adult with 16-18 evenly spaced ribs, last whorl with about twenty-five.

Genus Mystivagor, *nov.*

Type, ? *Simpulopsis mastersi*, Brazier.

This strange little shell is mysterious enough, but not sufficient to allow it to remain under *Simpulopsis* Beck, an unlike shell from a very remote locality.

It is very small and, as the animal is unknown, it is not certain where it should be located. From shell characters it may be a bulimoid ally of (say) *Pseudocharopa*, and may be living on trees.

Shell small, bulimoid, imperforate, three whorled, last very large, apical whorl finely radially striate, next radially distantly ribbed, third practically smooth. Coloration dull yellowish closely flamed with narrow brown zig-zag flames. Mouth large, oval, much higher than broad, lip thin, columella reflected, inner lip glaze crossing body whorl.

Mystivagor mastersi, Brazier.

? *Simpulopsis mastersi* Brazier, Proc. Zool. Soc. (Lond.), 1872, p. 619, November 3. Lord Howe Island. Coll. G. Masters.

Simpulosis (?) *mastersi* Hedley, Rec. Austr. Mus., Vol. i. p. 141, pl. xxi., fig. 9, June, 1891. A gully on the North Ridge, among dead leaves, rare.

The type measured $3\frac{1}{4}$ by $2\frac{1}{4}$ lines, aperture $2\frac{1}{4}$ by $1\frac{3}{4}$ line. Roy Bell sent a few specimens from the heights of Mt. Lidgbird. Series is necessary to determine if there be any altitudinal variation.

Family Hedleyoconchidae.

As evidencing the incompleteness of this essay, from amongst a lot of shells from the top of Mt. Gower, two dead specimens were sorted out of a shell apparently closely allied to the Australian *Hedleyoconcha*. The Australian shells live on trees, so that may be the habitat of this species, as tree-living snails are very difficult to observe in dense dark country.

Genus Hedleyoconcha, Pilsbry.

Hedleyoconcha Pilsbry, Man. Conch. (Tryon), Ser. ii., Vol. ix., p. 18, November 16, 1893. Orthotype, *Helix delta* Pfeiffer. (South Queensland.)

Shell conical, elevated, whorls little convex, periphery strongly keeled, base rounded, mouth quadrangular, perforate, columella a little reflected concealing umbilicus. The shells found at the island agree very well save for the wider open umbilicus; the sculpture is also weaker but seems of the same nature. This is an extraordinary find as hitherto *Hedleyoconcha* has only been known from South Queensland and New South Wales near the coast.

Hedleyoconcha addita, *sp. nov.*

(Plate xix., fig. 19.)

Shell small, conical, whorls little convex, periphery strongly keeled, base rounded, mouth quadrangular, lower edge rounded, lip thin, columella straight, reflected, umbilicus open, narrow, about one-seventh diameter of base. Coloration ? brownish (dead) white. Sculpture of very fine concentric striae decussated by growth lines. Umbilicus narrow, deep, open.

Breadth, 7.5 mm.; height, 6 mm. Found dead on top of Mt. Gower; from habits of continental allies may live on tree trunks.

Family Charopidae.

While checking this back, I noted that Etheridge reported (p. 26): "We failed to rediscover *H. textrix* Pfr., and *H. cimex* Pfr." But Hedley recorded many specimens of the former, and it is suggested that these are the shells recorded as *H. whiteleggei* by Etheridge, and the later recognition of their identity as *textrix* caused the transference of the name *whiteleggei* to the *Pseudocharopa*. However, true Charopids occur on the island, one a very handsome shell, and others more obscure.

Genus Goweroconcha, *nov.*

Type, *G. wilsoni*, nov.

Shell large, discoidal, widely umbilicate, mouth subcircular, sculpture regular, radial ribs, interstices radially threaded, apical whorls radially striate, sometimes appearing, at others the radials are strong, spire a little sunken, mouth subcircular, lip thin.

The type selected is the mountain large species, as *pinicola* is involved with *waterhousiae* in a matter of identity, *fide* Peile, and there is no question of the exclusion of the large *wilsoni*.

Goweroconcha waterhousiae, Hedley.

Endodonta waterhousiae Hedley, Rec. Austr. Mus., Vol. iii., p. 45, pl. xi., figs. 7-9, 13-14, August 5, 1897. Mt. Gower (error) = North Ridge.

Although the locality was given by Hedley as "Mt. Gower," the specimens are lowland shells from the North Ridge and elsewhere. These were identified in Hedley's earlier report as *textrix* Pfr., although not recognised as such by Etheridge, and presumably by Brazier at first. As above noted, Etheridge's citation of numbers of small Helices from the North Ridge as *H. whiteleggei*, and the lack of *textrix* Pfr., compared with the later recognition of the latter, and the errors surrounding *whiteleggei* suggest a transposition of names, which however is purely historical at present, and does not concern our nominations. Hedley gave an excellent description comparing it with *pinicola* Pfr., from the Isles of Pines, from data provided by E. A. Smith concerning the types. Peile discusses (?) *pinicola* Pfr., and concludes: "I am convinced that the locality 'Isle of Pines' given for *pinicola* in P.Z.S. in an error." He made no detailed examination, and did not mention the Isle of Pines shell, though French students, *e.g.*, Gassies, of the New Caledonian fauna, record it as still living at the Isle of Pines. From comparison the Lord Howe Island shell is distinct, according to Smith, as above noted. Hedley gave anatomical details, and recorded the radula formula as 130 x 13.8.1.8.13, with figures. Hedley observed that the initial whorl and a half showed radial hair lines, decussated by equally fine spiral striae. Examination of many specimens shows variation in this respect, the basis of the scheme being a smooth initial half whorl succeeded by radials. In some a faint microscopic decussation can be discerned, but the radials more often become more pronounced until the protoconch may be said to be entirely radially striate. I mention this as forms had been separated by means of this character.

GOWEROCONCHA WILSONI, *sp. nov.*

From the tops of the mountains, specimens occur much larger, flatter, with the spire more sunken, and the shell more discoidal. Upon critical examination the protoconch shows heavy radials, separable at sight from any phase of the lowland species. Further, two whorls are thus sculptured, a slight varix marking the boundary from the regular radials of the adult, which are closer than in the preceding, especially marked on the first adult whorl. Hedley recorded, for *waterhousiae*, the radial ribs, as ninety-five on the last whorl, fifty-three on the penultimate and thirty-two on the antepenultimate. Many have been checked and these figures are in agreement with the average Lowland shell. Hedley's size was also 7 mm. by 6 mm. by 3.5 mm., while the shell from the heights goes 10 mm. by 8.75 mm. by 3.5 mm. The riblets on the first whorl of *wilsoni* number sixty, on the second seventy-five, and on the last one hundred and ten to one hundred and twenty. The coloration is bright fawn with wavy red oblique flame markings, while the Lowland shells are dull, as Hedley described, pale buff with madder brown markings.

The type is from the top of Mt. Lidgbird, but similar shells occur on the top of Mt. Gower. This beautiful shell is named in memory of Gower Wilson, under whose leadership I reached the top of Mt. Gower, where I managed to collect some dead shells of this species, visibly separable from the smaller lowland shells.

GOWEROCONCHA WENDA, *sp. nov.*

(Plate xix., fig. 17.)

Shell smaller than *waterhousiae*, but of that relationship, colour pale brown. Shell small, discoid, last whorl descending a little when adult, protoconch a little sunken, two whorls with fine almost microscopic radial striae ending with a varix, adult sculpture of fine erect radial lirae, forty on the first adult whorl, fifty-five on the next and seventy on the last, the interstices with fine radial threads. Mouth subcircular, lip thin, columella vertical. Umbilicus very wide, exposing all whorls, more than one-third of the diameter of the shell. Breadth, 4.5 mm.; height, 2 mm. Top of Mt. Gower.

Four species described by Pfeiffer have been included in the Lord Howe Island fauna, and since rejected. Peile has re-examined the types and agreeing with the elimination of three suggests the admission of the fourth, without however furnishing any data to support his suggestion. These four were *Helix textrix, Helix cimex, Helix caecilia* and *H. ignava.* The first was dismissed long ago, the last two Peile does not exactly determine but concludes they are not natives of this island. The fourth, *Helix cimex*, he states, is broken and mended, but has the aspect of some Lord Howe Island species, and therefore may await re-discovery.

HELIX CIMEX, Reeve.

Helix cimex Reeve, Conch. Icon., Vol. vii., pl. 201, fig. 1411, December, 1854. Lord Howe Island, New Hebrides (Cuming). Cites "Pfr., P.L.S., November, 1854," but Pfeiffer's description was read at the December meeting, and published, p. 288, May 8, 1855.

No measurements were given by Reeve, who, however, gives height line which is 4 mm., and the figure shows coarse sculpture. Pfeiffer described his shell as being very finely striated, and measuring 3 mm. in breadth by

1-1/3rd mm. in height. Nothing agreeing with these two diverse descriptions is known here.

It may be noted that *Helix pinicola* is figured in the same place, fig. 1413, and was localised as from "Isle of Pines (Macgillivray)," Pfeiffer's description occurring later alongside that of *H. cimex* (p. 287).

Genus Pulcharopa, *nov.*

Type, *P. plesa* nov.

A small Charopid with distant ridges, subglobose shape, vertical columella, umbilicus deep, crateriform, of medium width, the edges showing a crenulate rim, lip thin, no internal teeth in mouth, which is deeper than broad.

Pulcharopa plesa, *sp. nov.*

(Plate xix., fig. 22.)

Shell depressedly globose, spire almost flat, whorls convex, sutures deep, umbilicus open, less than a third the breadth of the shell, deep, perspective, sides steep, mouth a little deeper than broad, columulla vertical, thin, not reflected, outer lip thin, sculpture of strong distant ribs. Coloration, dull fawn flamed with dull red. Apex one and a half whorls large smoothish microscopically striate radially, succeeding whorls with distant ridges, twenty-five on the first whorl, interstices microscopically striate radially, thirty to thirty-five ridges on next whorl, twenty-four on last three-quarters of a whorl, more widely separated than preceding; a larger shell with half a whorl more has mouth descending a little. Breadth, 3.5 mm.; height, 2.25 m. Boat Harbour and North Bay. A specimen collected by C. Hedley, without detailed location but definitely lowlands, is smaller, with distant ribs more regularly placed and more numerous.

Genus Charopella, *nov.*

Type, *C. zela*, nov.

Very small Charopid, somewhat discoidal in form, widely umbilicate, periphery subkeeled, colour flammulate, mouth small, subcircular, unarmed, lip thin, columella vertical, umbilicus wide, open, about one-third the diameter of the shell, apical whorls smooth.

While dealing with these small Charopids a couple of items regarding Norfolk Island forms may be interposed. Preston (Ann. Mag. Nat. Hist., Ser. 8, Vol. xii., p. 534, December, 1913) introduced the genus *Cryptocharopa*, for a small mud-carrying form, which he called *atlantoididea*. Examination of the type of *Helix exagitans* Cox (Proc. Zool. Soc. (Lond.), 1870, p. 82: Norfolk Island), which is broken, shows that it is undoubtedly Preston's species, and Cox's name must be revived for the type of *Cryptocharopa*. In the same place Preston called another shell *Charopa mathewsi*, which is somewhat like the present species, but is flatter, more discoidal, more widely umbilicate, thin, mouth subquadrate, sculpture radials, interstices reticulate, apical whorls smooth, and is here made the type of a new genus, *Penescosta*. It is hoped to review completely the Norfolk Island Land Mollusca at an early date.

Charopella zela, *sp. nov.*

(Plate xix., fig. 20.)

Shell small, subdiscoidal, spire elevated a little, whorls rounded, sutures

deep, last whorl subkeeled peripherally. Coloration, pale fawn flamed with golden brown. Apical whorls one and a half, smooth, adult whorls three and a half, sculptured with separate ribs closely set together, the interstices radially striate, the ribs number about seventy on the last whorl. The mouth subcircular, the outer lip thin, columella small, vertical, a glaze crossing body whorl to edge of outer lip. Breadth, 3 mm.; height, 1.5 mm. Top of Mt. Gower.

CHAROPELLA WILKINSONI, Brazier.

Helix wilkinsoni Etheridge, Austr. Mus. Mem. No. 2, p. 26, May 1, 1889. *Nomen nudum.* "A pretty, flatly coiled, and equally rare shell." North Ridge.

Helix (Charopa) wilkinsoni Brazier, *ibid.*, pl. v., figs. 3-4.

Charopa wilkinsoni Hedley, Rec. Austr. Mus., Vol. i., p. 138, June, 1891, described.

The figures, though reversed, showed the upper and lower surfaces of the species Hedley described as measuring 2½ x 2 x 1 mm., obtusely carinate, yellow and red radiating dashes, microscopic costae decussated by similar spiral lyrae (sic) umbilicus one-third.

Hedley collected some specimens about the same locality, and these prove to be related to *zela*, but are much flatter, more whorls, more strongly keeled, with finer sculpture, and with wide, open umbilicus. They measure fully 3 mm. in breadth, with only 1 mm. in height.

Genus GYROPENA, *nov.*

Type, *G. verans*, nov.

Small discoidal Charopids, spire sunken, mouth vertical, unarmed, widely umbilicate, columella small, straight, apical whorls large, concentrically striate, sculpture of very fine, close-set ribs, too numerous to count easily, probably about eighty on first adult whorl

GYROPENA VERANS, *sp. nov.*

(Plate xix., fig. 16.)

Shell discoidal as above. Coloration pale fawn with brown patches which increase to uniformity. Umbilicus open, about one-third the breadth of the shell. Breadth, 3 mm.; height, 1.25 mm. Top of Mt. Gower.

A larger one is broken but the mouth is descending.

Genus CHAROPINESTA, *nov.*

Type, *C. sema*, nov.

Smallest Charopids, depressed turbinate, spire a little elevated, whorls rounded, sutures deep, mouth subcircular, umbilicus narrow, deep, sculpture fine. A series of very small Charopids with unarmed mouth recall the armed forms from Norfolk Island and the Kermadecs, but there is an unarmed similar one from the latter place.

CHAROPINESTA SEMA, *sp. nov.*

(Plate xix., fig. 14.)

Very small, depressedly turbinate, as above. Coloration pale yellowish. Sculpture very fine threads radially, no concentric striae observed. Apical whorls smooth. Umbilicus deep, open, about one-fourth the diameter of

the shell, mouth subcircular, a little large for form of shell. Breadth, 1.5 mm.; height, 1 mm. Goat Island; and on the lowlands.

CHAROPINESTA GOWERI, *sp. nov.*

(Plate xix., fig. 15.)

Shell a little larger, similar in form, spire less elevated. Coloration deep red-brown. Sculpture of fine threads radially, but more pronounced and more distinct, and there appears to be a slight concentric striae noticeable on base. Apical whorls smooth. Umbilicus deep, open, about one-fifth the diameter of the shell, mouth subcircular, lip thin. Breadth, 2.25 mm.; height, 1 mm. Mt. Gower.

CHAROPINESTA SUAVIS, *sp. nov.*

(Plate xix., fig. 21.)

Similar to the two preceding. Coloration red-brown. Similar sculpture of fine radial threads, most like *sema*, but of the size of *goweri*, and with smaller umbilicus. Apical whorls faintly radially striate, the spire less elevated than in the preceding, no concentric striae visible. Umbilicus deep, about one-fifth the breadth of the shell. Breadth, 2.5 mm.; height, 1 mm. Mt. Lidgbird, near the top.

Genus PERNASTELA, *nov.*

Type, *P. charon*, nov.

Shell small, conicoturbinate, whorls rounded, sutures deep, periphery semi-keeled, base rounded, umbilicus open, deep, mouth small, rather quadrate, not continuous, lip thin, apex spirally striate, adult distant ribs radially. This may be classed in the Charopidae tentatively.

PERNASTELA CHARON, *sp. nov.*

(Plate xix., fig. 23.)

Shell as above. Coloration pale fawn with darker markings. Apex large, a little elevated, adult sculpture of rather distant ribs running into umbilicus, which is medium, about one-fifth the diameter of the base. The interstices between the ribs are radially threaded. Mouth rather small, columella vertical, thin. Breadth, 3 mm.; height, 2 mm. Lowlands, near the Pines, etc.

PERNASTELA HOWENSIS, *sp. nov.*

(Plate xix., fig. 18.)

Similar in form but with much finer sculpture. Coloration uniform brown. Apex large, adult sculpture regular, closely set ribs running into umbilicus, which is about one-fourth width of base. Mouth quadrangular, columella straight, lip thin. Breadth, 3.5 mm.; height, 2 mm. Heights of Mt. Gower.

PERNASTELA GNOMA, *sp. nov.*

(Plate xix., fig. 8.)

Very small, with very coarse sculpture. Five whorls, almost shouldered, distant ribs about twenty on last whorl, umbilicus one-fourth of the base, mouth small, sublunar, lip thin. Breadth, 1.5 mm.; height, 1 mm. Black Face, Mt. Lidgbird.

Family Microcystidae.

Burrington Baker's iconoclastic treatment of Pacific *Microcystis*, etc., has left a pile of rubble, sparing no material with which to build anew. Consequently the real classification is left to the "guessing" conchologists, who deal with tangible molluscan remains, and do not sport with elusive intestinal troubles. Each anatomist himself blithely contradicts the other's result, while sometimes naively acknowledging his ignorance of his own native molluscs. Of which more later.

Genus Melloconcha, *nov.*

Type, *M. delecta*, sp. nov.

Shell small, elevated conic, whorls rounded, base rounded, columella straight, reflected, imperforate, mouth sublunar, lip thin.

This somewhat recalls *Kieconcha*, which, in my youth, I left unfigured (at that time I was by no means an erudite homonymist (whatever that may mean)), and now remedy my error (plate xx., fig. 14) for comparison.

Melloconcha delecta, *sp. nov.*

(Plate xx., fig. 8.)

Shell small, conic, elevated, whorls a little rounded, sutures impressed, last whorl a little keeled, base rounded, columella straight, reflected, mouth sublunar. There is no distinct sculpture, nor are the apical whorls distinguished from the adult whorls. There are about six whorls in all, brown in coloration. Breadth, 5 mm.; height, 4 mm. North Bay, also on heights.

Melloconcha prensa, *sp. nov.*

(Plate xx., fig. 9.)

Shell small, depressed, spire a little convex, whorls rounded, sutures impressed, last whorl very rounded, base rounded, imperforate, columella straight, reflected, thickened, mouth rather large, lip thin. Coloration pale greenish, glossy. Whorls six, apical ones not distinct, all minutely striate. Breadth, 7 mm.; height, 3.5 mm. North Ridge.

Melloconcha grata, *sp. nov.*

(Plate xx., fig. 13.)

Shell small, subconical spire, whorls rounded, suture impressed, last whorl keeled, columella a little slanting, reflected, mouth sublunar, large, lip thin. Coloration deep bright brown. Whorls five, microscopically striate, no difference between adult and apical whorls. Breadth, 7 mm.; height, 5 mm. Mt. Gower, near the top, on moss.

Genus Tribocystis, *nov.*

Type, *T. rosacea*, nov.

Small Microcystid shells, subdiscoidal, flattened spire, subkeeled periphery, imperforate, columella slanting, thickened, mouth small. If we judge by Burrington Baker's standards each of the shells here mentioned may be the basis of a subgenus.

Tribocystis rosacea, *sp. nov.*

(Plate xx., fig. 7.)

Shell small, subdiscoidal, spire very little raised, whorls slightly convex,

sutures impressed, last whorl keeled at periphery, base rounded, columella slanting, slightly thickened. Whorls four and a half, no difference between the apical and adult whorls, sculpture microscopic radial growth lines. Coloration fawn with a rosy tint, darker towards the apex. Breadth, 4 mm.; height, 1.5 mm. Lowlands, near the Pines, etc.

TRIBOCYSTIS FLAVESCENS, *sp. nov.*

(Plate xx., fig. 10.)

Shell small, larger than preceding but similar in form, spire more elevated. Coloration pale yellowish. Whorls five and a half with no distinction between the apical and adult ones, smooth, only faint growth lines, columella almost vertical, a little thickened. Breadth, 6 mm.; height, 3.25 mm. Lowlands, North Ridge, etc.

TRIBOCYSTIS ALMA, *sp. nov.*

Shell very small, subdiscoidal, spire little elevated, whorls rounded, sutures impressed, last whorl very rounded, base rounded, mouth oval, columella slanting, thickened. Coloration yellowish fawn, glossy. Shell smooth, sculpture only indistinct growth lines, a little more evident on the earlier whorls, no concentric sculpture. Mouth transverse, semilunar, outer lip thin, a fine glaze connecting the inner and outer lip across the glaze. Breadth, 4 mm.; height, 2 mm. North Ridge.

ANNACHARIS MIRANDA, *gen. et. sp. nov.*

(Plate xx., fig. 2.)

Small Microcystid with channelled sutures and thickened columella. Shell globosely turbinate, thin, glossy greenish, spire elevated, whorls convex, deeply channelled at sutures. Whorls six and a half. Sculpture only growth striae. Mouth semilunate, medium size, columella slanting, heavily callused. Breadth, 7 mm.; height, 4.5 mm. Found by Dr. W. R. B. Oliver on the top of Mt. Gower. Also on the top of Mt. Lidgbird by Roy Bell.

All the preceding agree in being imperforate, and may be more or less generally related to each other, but the next two stand quite apart, and it would be interesting to compare anatomical reports from two sources.

Genus DIGNAMOCONCHA, *nov.*

Type, *D. dulcissima*, nov.

Shell small, delicate, thin, flat-topped, periphery sharply keeled, sloping inwards, a little convexly, to deep wide crateriform umbilicus, mouth quadrate, lip thin. Sculpture, delicate decussation.

DIGNAMOCONCHA DULCISSIMA, *sp. nov.*

(Plate xx., fig. 6.)

Shell small, whorls very slightly convex, spire little elevated, periphery with fine pinched keel, below sloping inwards until stopped by another sharp keel bordering a broad craterlike umbilicus, deep, perspective, disclosing all whorls to apex, columella slanting upwards, a little reflected, mouth quadrangular, lip thin. Coloration greyish-fawn flamed with brownish. Apical whorls two, adult whorls three. Sculpture of minute radial threads crossed by minute concentric striae, the under-surface showing the threads more prominently. Breadth, 6 mm.; height, 3 mm.

From top of Mt. Lidgbird. An odd specimen from top of Mt. Gower. There is a tendency for the last whorl to descend with age.

Genus Deliciola, *nov.*

Type, *D. charis,* nov.

Shell minute, subdiscoidal, flat-topped, apex a little elevated, periphery strongly keeled, base very convex, umbilicus small, deep, mouth a little broader than high, columella straight, lip thin.

Deliciola charis, *sp. nov.*

(Plate xx., fig. 12.)

General features of shell as above. Colour greenish-fawn. Adult whorls two and a quarter, one and a half apical whorls smooth. Sculpture of upper surface radial threads closely set, a little raised, forming a peripheral fringe, a slight depression preceding the keel, sutures deep; sculpture of base microscopical radials. Breadth, 2 mm.; height, 1 mm.

Family Zonitidae.

Etheridge wrote, p. 26: "On the low grounds at the northern end of the island, amongst cultivated ground, a small species was found in numbers to which the name of *H. Unwini* Brazier, is attached." This is a *nomen nudum.* On plate iv., figs. 5-6, *Helix (Patula) Unwini* Brazier, is figured (reversed). Hedley described the species under the genus *Patula.* Now Peile, from examination of a series sent by Brazier, states that this is the American shell, Z*onitoides minusculus* Binney. Now we really find trouble as this species had been made the type of a genus, *Pseudovitrea,* by Baker, the type of *Zonitoides* being the shell known as *nitida* Muller. By the way, I noticed that Taylor stated the Australian shell known as *nitida* Muller, is not that species, but *alliaria* Miller. Then Baker further states that the Hawaiian shell, *kawaiensis* Pfr., *i.e.,* Reeve, made the basis of a new genus, *Hawaiia,* by Gude, is identical with the American *minusculus,* though be it noted it is half as big again as the latter, different colour, form, etc. Consequently, if Baker be followed, *Helix unwini* Brazier, should be regarded as a synonym of *Hawaiia minusculus* Binney. It may be remarked that Baker places *Hawaiia* in a separate subfamily from *Zonitoides.* In the same place Baker apologises for the ignorance of palaearctic forms, while sweeping through the Pacific fauna like a bush-fire.

Roy Bell found the species in the Old Settlement living alongside *Vallonia,* sp. I should determine this as *pulchella* Müller, but it seems difficult for British conchologists to separate this species from *excentrica* Sterki, as some regarded Norfolk Island shells as the latter. Perhaps both "species" occur in the Australasian localities as Sterki always found them together in Europe and America.]

Family Nitoridae.

To this family is allotted the species named *catletti* and its allies. The species are larger than the Microcystids, and have a different appearance, though their general characters are very similar, but the animals have been stated to differ by anatomists, who, however, as usual, disagree.

Genus Innesoconcha, *nov.*

Type, *H. catletti,* Brazier.

Shell small, but always larger than species of *Microcystis* (s.l.), sub-

discoidal to subconical, whorls rounded, periphery keeled, base rounded, imperforate, mouth transversely semilunar, edge of lip thin, columella slanting, thickened. Animal viviparous, young being found in the adult shells.

INNESOCONCHA CATLETTI, Brazier.

Helix (Microcystis) catletti Brazier, Proc. Zool. Soc. (Lond.), 1872, p. 617, November 3. Lord Howe Island, off the coast N.S.W. (Coll. Austr. Mus.).

Microcystis catletti Hedley, Rec. Austr. Mus., Vol. i., p. 137, pl. xxi., fig. 5, June 30, 1891. (Rabbit Island.).

The measurements are 4 by 3½ by 2¼ lines, *i.e.*, 8 by 7 by 4.5 mm., a somewhat conical shell. This was recognised as from Goat Island, as Etheridge wrote: "The little Rabbit or Goat Island does not appear to have a species peculiar to itself, for *H. catletti* Brazier, the common species here, occurs on the main island." However, when the mainland shells were compared, they were found to be larger and comparatively less elevated, and were named

MICROCYSTIS CATLETTI var. MAJOR, Hedley,

in the Rec. Austr. Mus., Vol. i., p. 137, June, 1891, from the Old Settlement.

This has been re-named *subconica*, measuring 11 mm. by 10 mm. by 6 mm., on account of the invalid varietal name. Hedley used the genus *Microcystina*, in the explanation to plate.

INNESOCONCHA SEGNA, *sp. nov.*

Specimens from Boat Harbour, an inlet on the south-east coast, differ in their large size, flattened form and glossy surface. Coloration pale green. Subdiscoidal, spire a little elevated, periphery very slightly keeled, base rounded, mouth rather large, transverse, columella slanting, thickened and toothed, and leaving no signs of chink seen in preceding. Breadth, 11.5 mm.; 6.5 mm.

INNESOCONCHA PRINCEPS, *sp. nov.*

(Plate xx., fig. 5.)

Another large species from the heights of Mt. Gower differs at sight in its bright coloration, being banded with brown and white. Shell subdiscoidal, spire a little elevated, very slight peripheral keel, mouth smaller than in preceding, columella less slanting, scarcely thickened. Whorls six, no demarcation between apical and adult, sutures lightly impressed. Shell smooth, only indistinct growth lines present. Breadth, 10 mm.; height, 5.5 mm. Heights of Mt. Gower.

INNESOCONCHA ABERRANS, *sp. nov.*

(Plate xx., fig. 15.)

Shell strongly elevated, conical, whorls little convex, sutures light, last whorl keeled at periphery, base rounded. Coloration brown. Whorls six, no apical distinction, sculpture microscopic radial growth lines forming matt surface, mouth large, columella almost straight, thin. Breadth, 7 mm.; height, 6 mm. Black Face, Mt. Lidgbird.

Family GUDEOCONCHIDAE.

The beautiful large shell called *Helix sophiae* by Gaskoin, the name however first published by Reeve, seems to be referable exactly to no

expressed family, although its anatomy is known. As a matter of fact that seems to complicate matters, so that it seems best to allow it a family for itself until the anatomists decide.

Genus GUDEOCONCHA, *nov.*

Type, *Helix sophiae,* Reeve.

Shell large, thin, whorls few, spire a little elevated, last whorl disproportionally large, mouth large, broader than long, lip thin, columella slanting, a little reflected, umbilicus present but very small.

The animal was figured by Cox (Proc. Linn. Soc. N.S.W., Ser. 2, Vol. ii., p. 1061, pl. xx., figs. 8-9, 1888), as a species of *Helicarion* on account of its external form. Hedley, after dissecting the species in connection with other snails, concluded "*Sophiae, howinsulae* and *hilli* are allied species, and are rather too dissimilar to the type of *Helicarion* to be admitted into that genus. I prefer to leave them at present under *Nanina,* using the name in its widest significance." The radula formula was given for the var. *conica* as 140 rows of 70:26:1:26:70.

GUDEOCONCHA SOPHIAE, Reeve.

Helix sophiae Reeve, Conch. Icon., Vol. vii., pl. 196, fig. 1377, December, 1854. Lord Howe Island. Macgillivray.

Helix sophiae Gaskoin, Proc. Zool. Soc. (Lond.), 1854, p. 152, April 11, 1855. Lord Howe Island. (1-8/10th in. by 6/10th inch.).

Helicarion sophiae Cox, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. ii., p. 1061, pl. xx., figs. 8-9, 1888.

Nanina sophiae Hedley, Rec. Austr. Mus., Vol. i., p. 135, June 30, 1891.

The type, figured by Reeve, was a large Lowland shell, with spire a little elevated and the figure's measurements equal, 30 mm. by 20 mm. It was very common and variable, but the variation was not collated with locality, save in the case of the Rabbit or Goat Island form, which Brazier called NANINA SOPHIAE var. CONICA, figured in the Museum Report, pl. v., figs. 5, 6, while Hedley in the Records of the Aust. Mus., Vol. i., p. 135, pl. xxi., fig. 3 (jaw), and pl. xxii., fig. 7 (radula), June 30, 1891, figured the jaw and radula, giving the formula as above.

Anywhere else these would be easily regarded as distinct, the measurements, 30 by 20 mm., and 25 by 19 mm., giving little real idea of the distinctive appearance. Roy Bell sent many specimens from the heights of the mountains of a larger size and more depressed appearance, but the most marked form was one from the little Slope of Mt. Gower which was named

GUDEOCONCHA MAGNIFICA.

This is much larger, mouth more expanded, spire more depressed, shell thinner and sculptured with very fine ripple marks, and of bronze coloration, the shell showing little calcification, the type measuring 39 mm. by 19 mm., with the aperture 23 mm. by 14 mm.

The juvenile of all the forms is seen as a flat-topped shell, the apical whorls slightly elevated, a strong peripheral keel with the base very convex, a small umbilicus, the columella only slightly reflected: first one and a half whorls smoothish ending with a slight varix, the succeeding adult sculpture of obsolete radials, a pronounced small tucker along the edge of the peri-

phery; the under-surface finely radially striate crossed by fine concentric striae. With age the whorls descend, the mouth broadens, peripheral keel disappears and umbilicus almost vanishes.

Family EPIGLYPTIDAE.

Although Hedley denied the association of this species with *Helicarion,* Baker interprets his denial thus: "As indicated by Hedley, *Epiglypta,* although a distinct genus, must be quite closely related to *Helicarion.*" Such an interpretation is inadmissible as the Helicarions, as loosely understood at present, constitute a confused series of similar shell construction, which is quite unlike *Epiglypta* in every detail. The introduction of the name *Epiglypta* is worthy of quotation in view of the many recriminations in recent years. Pilsbry, in the Man. Conch. (Tryon), Ser. 2, Vol. viii., p. 133, February 25, 1893, included "Vol. iii., p. 90. *H. howinsulae* is a species of *Nanina,* and the type of the section *Epiglypta* Pils." Referring back to Vol. iii., p. 90, among the unfigured species is the name "*H. howinsulae* Cox. Lord Howe Island."

As a matter of fact, this is a very beautiful shell of outstanding distinction with no relationship to any Helicarionid. Shell large, thin, depressed Helicoid, upper surface convex, lower surface more convex, a notable fringed peripheral keel separating the upper highly sculptured surface from the lower smooth surface, mouth large, open, very little broader than deep, columella sloping, a little reflected, almost concealing the umbilical chink.

Hedley gave the radula formula as 120 rows of 90.24.1.24.90, and Baker counted 103.25.1.25.103.

EPIGLYPTA HOWINSULAE, COX.

Helix howinsulae Cox, Proc. Zool. Soc. (Lond.), 1873, p. 148, June. On a mountain, Lord Howe Island.

Helix howinsulae Cox, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. iv., p. 660, pl. xix., figs. 10-11, 1890. (Upper and lower surfaces.)

Nanina howinsulae Hedley, Rec. Austr. Mus., Vol. ii., p. 135, pl. 21, fig. 7; pl. 22, figs. 5-8, June 30, 1891. (Anatomy.)

Epiglypta howinsulae Baker, Bernice P. Bishop Mus., Bull. 166, p. 264, pl. 47, figs. 1-3, 1941. (Anatomy.)

The shell is a bright red brown in colour, the upper surface sculptured with numerous wavy ribs, which strongly crenulate the keeled periphery. It has been long known as living on the heights of Mt. Gower, and when Roy Bell scaled the hitherto inaccessible peak of Mt. Lidgbird, and found the species living there, specimens were critically examined, but not the slightest variation could be determined.

The immature proves to be planulate above, convex below, narrowly openly umbilicate, columella slightly reflected exactly as in adult; first whorl smoothish convex, sometimes faintly radiate, developing an anteperipheral groove and stronger radials, which developed into the adult sculpture and ornament the periphery, under surface showing radials faintly. With age the whorls descend a little to provide the convex upper surface, the mouth descending, the columella thickening and entirely covering the umbilicus. Breadth, 38 mm.; height, 20 mm.

Family HELICARIONIDAE.

This is by no means the "family" so-called by Baker, which is a pot

pourri, composed of imaginary genital complexes (or perplexes), which have been dissected out of discordant molluscan shell remains.

The present family is restricted to shells generally agreeing with that of *Helicarion*, s. str., but even with this limitation it cannot be considered a homogeneous association. However, we have one factor in our favour, *Helicarion* was based on an Australian development, and these may be related.

Genus Howearion, *nov.*

Type, *Howearion belli*, nov.

A flat-topped semi-globose *Helicarion* with a radula formula of 163 rows of 430.24.1.24.430. The immense number of marginals easily distinguish this form, as other *Helicarion*-like genera have very different formulae, e.g., *Vercularion*, 103.17.1.17.103, *Mistarion*, 45.18.1.18.45, and *Ellarion*, 20.12.1.12.20.

Dendrolamellaria Preston, Ann. Mag. Nat. Hist., Ser. 8, Vol. xii., p. 522, December 1, 1913, with type, *D. mathewsi* Preston, from Norfolk Island, has a very different shell, while the Kermadec *H. kermadecensis* Smith, is smaller, very thin, more convex spire, more globose, base even thinner, and may be distinguished as *Kermarion*, gen. nov.

Howearion belli, *sp. nov.*

(Plate xx, fig. 3.)

Shell thin, subglobose, spire a little elevated, mouth large, a little rounded, columella curved, not reflected. Coloration shining green. Surface smooth. Breadth, 15 mm.; height, 10 mm. Top of Mt. Gower.

Howearion hilli, Cox.

Helicarion hilli Cox, Proc. Zool. Soc. (Lond.), 1873, p. 151, pl. 16, figs. 7a-b, June. "On the top of a high mountain, Lord Howe Island."

Cox wrote: "Striped with lines of growth transversely, and longitudinally at irregular intervals with fine waved lines." Size, .34 in. by .25 in. by .14 in. This is a small shell, equalling 8.5 x 6.25 x 3.5 mm., but the illustration, supposed to be natural size, is double that, and there appears to be confusion once again with the locality, as Etheridge wrote, p. 26: "On the lower grounds . . . we also found *Helicarion Hilli*, Cox, but did not trace it above a height of 400 to 500 feet."

The lowland shell, dissected by Hedley, and recorded as *Nanina hilli*, Rec. Austr. Mus., Vol. i., p. 136, pl. xxii., fig. 6 (jaw), pl. xxii., fig. 2 (radula), June 30, 1891, differs from the highland form in its lower spire and broader mouth, as figured by Cox, and especially by the well-marked, though microscopic, concentric wavy striae.

A normal specimen measures 18 mm. in breadth by 8 mm. in height, and is very pale greenish, and was called *palmarum*, the exact identity of *hilli* being doubtful.

Genus Parmellops, *nov.*

Type, *Parmella etheridgei*, Hedley.

Hedley fully described a curious mollusc, under the above name, as cited below, and referred it to *Parmella*, introduced by H. Adams, Proc. Zool. Soc. (Lond.), 1867, p. 308, pl. xix., fig. 20, October 22, from Fiji. Baker, how-

ever, regards the Fijian shell as "Genus and species remain *nomina dubia*. However, a *Helicarion*-like derivative of *Orpiella* would not be surprising."

Shell almost planate, few whorls, last very large, outer edge a little curved, base missing, sculpture of growth lines only, a thin golden periostracum present in life. Radula formula of 145 rows of 300.15.1.15.300.

Hedley referred the species "to a distinct and well-defined genus of the *Helicarioninae*," and the genus is included in the family Helicarionidae, as here restricted.

PARMELLOPS AUSTRALIS, Reeve.

Vitrina australis Reeve, Conch. Icon., Vol. xiii., pl. x., sp. 70, May, 1862. Eastern Australia.

Vitrina etheridgei Etheridge, Austr. Mus. Mem. No. 2, p. 26, May 1, 1889. *Nomen nudum*. Lower grounds, Lord Howe Island.

Vitrina (Parmella) Etheridgei Brazier, *ibid.*, pl. v., fig. 9.

Parmella etheridgei Hedley, Rec. Austr. Mus., Vol. i., p. 78, pl. xi., September, 1890. (Anatomy).

Etheridge wrote: "A fine new species of *Vitrina* was found on the stems and leaf sheaths of the palms growing on the lower grounds, and is called by Mr. Brazier, *Vitrina Etheridgei*." This is a *nomen nudum*. Brazier's figure shows the interior, and Hedley gave a sketch of the external appearance while fully discussing the anatomy, and referring it to *Parmella*, another account scorned by Baker.

CONCLUSIONS.

The main conclusion is that there is much to be yet discovered about this faunula, and, while the *Placostylus* indicates New Caledonia as its source, Lord Howe Island must be the remnant of a much larger piece of land, and that the separation must be of very ancient date. To discuss the pros and cons of this molluscan fauna alone would occupy many pages. Thus, the evolution of *Epiglypta* and *Gudeoconcha* must have taken much time, and while it seems the former has reached stabilisation, the latter is still showing local variation. So far no suggestion as to their relationship has been made, worthy of consideration, Baker's allusion to *Epiglypta* being somewhat grotesque. Again the family Pseudocharopidae is anomalous, the half dozen species being well differentiated, indicating a long time necessity. As to the many smaller land shells there can be little comparison until the islands to the north are better searched. The only fact is that they have very little in common with the small forms collected at Norfolk Island and at the Kermadec Islands, nor are they at all like the small species known from the east coast of Australia. Many small shells have been collected in New Caledonia, but there is much yet to be done there, and it is possible still that relatives may occur in that place. An interesting ground for study is the coral sand rock which has already revealed many species as noted in an appendix attached hereto.

APPENDIX I.

Subfossil MOLLUSCA.

Etheridge discussed in detail the Coral-sand Rock Series, which is "the chief fossiliferous deposit on the island. It has yielded the remains of *Meiolania*, eggs of turtles, bird-bones, and recent species of both land and

marine shells. . . . The balance of evidence may, I think, be said to weigh in favour of the aeolian origin of the Lord Howe coral-sand rock. . . . The abundance of bird-bones and land shells, with the more or less perfect preservation of the latter. . . . The samples examined allowed the discrimination of many land shells."

Etheridge reported upon the fossil form of the *Placostylus*, but nothing appears to have been recorded about the "many land shells" discriminated. Roy Bell found one place "near Johnson's" or "below Johnson's and T. B. Wilson's," and carefully collected many of the smaller shells with rather surprising results that deserve record for future investigation. More recently, Captain McComish found similar shells at the foot of a cliff in Middle Beach, 70 feet high.

All the shells are more solid than recent specimens, and this seems to be a constant feature of subfossil remains, some calcification taking place after the death of the snails, not before. As instance, in these lots there are many strongly calcified *Parmellops* and *Howearion*, which in life show very little calcification. The occurrence of so many of these frail molluscan shells is remarkable, while they definitely indicate the aeolian nature of the rock. Their plenitude is also strongly confirmatory of that view. The next remarkable feature is the presence of species at present rarely found, and suggest widely spread distribution, and also, perhaps, our incomplete knowledge of this small island molluscan fauna. Thus, *Dignamoconcha dulcissima* was only found on the top of Mt. Gower, and rarely the top of Mt. Lidgbird, yet it is not uncommon in both Roy Bell's collection, and in Captain McComish's series. Another *Pulcharopa plesa* is known from only a few recent specimens from North Bay, North Ridge and Boat Harbour, but is quite common, probably the commonest, shell in Roy Bell's selection.

The full list picked out reads *Palaina m. semilevis, P. levicostulata, P. howeinsulae, P. nicholsae, Placostylus bivaricosus* var. *solida, Gowerocoucha waterhousiae, Pulcharopa plesa, Pernastela charon, Melloconcha delecta, Tribocystis rosacea, Innesoconcha "major," Dignamoconcha dulcissima, Gudeoconcha sophiae, Howearion hilli*, and *Parmellops australis*.

One or two others not determinable occur, but a disturbing find was of two of the problematical *unwini*. More research is necessary to prove if these were in situ or were derivative. If the former, a revision of *Hawaiia* may become necessary.

Another curious factor to be considered is the occurrence of numerous small fresh water shells all over the island, which show variation in every locality. These are mentioned in a succeeding Appendix.

APPENDIX II.

The fact that there are fresh water shells at all on the island is really surprising, so that they may be here mentioned, as their occurrence is noteworthy in many ways. The same confusion arose with these as with the land shells. Etheridge reported (p. 27): "Under very trying circumstances we were fortunate enough to discover fresh water non-pulmoniferous forms at a considerable height on the eastern flanks of Mt. Lidgbird in steep gullies running down to the shore. These consisted of two species of *Bythinella*, crawling over stones. One, a spirally striated shell, with a deep suture, will be described as *B. Whiteleggei*, by Mr. Brazier, and the other as *B. Ramsaii*." There is nothing much determinable here, and the illustrations (reversed) are not much more helpful, as *Bythynella ramsaii* Brazier, pl.

iv., figs. 15, 16, enlarged, " x 3," measures 13 x 8 = 4-1/3rd x 2-2/3rd mm., and *Bythynella whiteleggei* Brazier, pl. iv., figs. 17, 18, " x 4," measures 12 x 7 = 3 x $1\frac{3}{4}$ mm., the latter being apparently smaller and with deeper sutures.

Hedley fully described, but again altered the habitats, *whiteleggei* "from the creeks to the north of the Old Settlement," size $2\frac{1}{2}$ x 1 mm., and *ramsayi* "Eastern flanks of Mt. Lidgbird," size 4 x 2 mm., the former "strongly sculptured," the latter with faint striae.

There are obviously two series, a narrow elongate form and a broader bulkier one, apparently represented by *whiteleggei* and *ramsayi* respectively. These are found in most streams, and have evolved colonies in most of them so constant that no fewer than six names were introduced, together with a special generic name. To stabilise the matter so that it will assist later investigations these names are published.

Fluviorissoina, gen. nov. Shell small, few whorls, mouth oval, almost free, breadth more than half length, sculpture of concentric striae.

The type may be selected as *B. ramsaii*. *B. whiteleggei* is more cylindrical, smaller mouth, mouth similar but less produced, more whorls, and breadth not much more than half height. The sutures generally not very deep. The generic name *Pupidrobia* is introduced for this group; type, *P. gracilis*, nov., to mark the distinction for comparison.

When these two occur together, as on the Little Slope, they are easily separable in size, as well as in form, so that we have

Fluviorissoina oscitans, nov. Small and broad; length, 3 mm.; breadth, 2 mm.

Pupidrobia gracilis, nov. Larger and narrower; length, 3.5 mm., breadth, 1.5 mm.

The largest, however, is a *Fluviorissoina*, from Bird Point, which measures in length 4.5 mm., breadth 2.25 mm., which is almost the type form of *ramsaii*. It may be noted that specimens from the Erskine Valley were regarded as typical at that time. Hedley transferred the locality of *whiteleggei* to the creeks of the Old Settlement, with size 2.5 mm. by 1 mm., but much larger shells from thereabouts measuring 3.5 mm. by 2 mm. were named *Pupidrobia pupa*, nov.

The species of *Fluviorissoina* from the same locality measured 3 mm. by 1.75 mm., and were called *royana*, nov. A small species was found on the top of Mt. Gower, measuring 2.5 mm. by 1.5 mm., and was named *pusillior*, nov.

This leaves the Erskine Valley shells, which may provide still more variations, and if a mathematical census were undertaken the results would be astonishing. So far all the samples studied show comparative constancy, a series of some hundred examples from the Erskine Valley being all *Fluviorissoina*, broad like *oscitans*, but a little shorter, and have been called *obesa*, nov., the shell measuring 2.75 mm. in length by 2 mm. in breadth.

The nearest relative appears to be *Hydrobia gentilsiana* Crosse, Journ. de Conch., Vol. xxii., p 112, January 1, 1874, figured, p. 395, pl. xii., fig. 9, October 1, 1874, measuring 3 mm. by 1.5 mm., from Oubatche, New Caledonia. The genus *Hemistomia* Crosse, *ibid.*, Vol. xx., pl. 72, p. 352, pl. xvi., fig. 8, January-October, 1872, with species, *caledonica*, measuring 2.5 mm.

by .75 mm., seems the most nearly allied genus, and it may be that *Heterocyclus* Crosse, *ibid.*, Vol. xx., p. 156, pl. xvi., fig. 6, 1872, may also be related.

APPENDIX III.

Among a series of Tornatellinids taken from a cut on a tree "Near the Pines" was one specimen of an *Imputegla*, and I was inclined to neglect it, but specimens have now been discovered in the wilds of North-western Australia by Dr. Consett Davis. This suggests that the Lord Howe specimen represents an endemic species so it is here described.

Imputegla evada, *sp. nov.*

Shell small, subglobose, subperforate, thin, translucent, brown. Whorls three, well rounded, suture distinct. Sculpture of very fine striae, no lamellae present. Outer lip thin, columella straight, reflexed, concealing umbilical chink. Shell covered with earthy particles as usual. Breadth, 1.5 mm.; height, 1 mm.

The genus *Imputegla* Iredale (Austr. Zool., Vol. viii., p. 305, March 12, 1937), for *P. circumlitum* Hedley, belongs to the family Pupisomidae.

EXPLANATION OF PLATE XVII.

Fig. 1. Mount Lidgbird and Mount Gower from Old Settlement beach, looking southward, Goat Island (or Rabbit Island) on right.
Fig. 2. North Ridge and Mount Eliza from the Lower Road, Wall of Mount Lidgbird at right, looking over lagoon.
Fig. 3. Southern Razor Back of Mount Gower.
Fig. 4. Vegetation, S.W. Recess of Mount Gower.

EXPLANATION OF PLATE XVIII.

Fig. 1. *Monterissa gowerensis*, Iredale.
„ 2. *Opinorelia howeinsulae*, Iredale.
„ 3. *Limborelia innesi*, Iredale.
„ 4. *Tornelasmias lidgbirdense*, Iredale.
„ 5. *Elasmias schola*, Iredale.
„ 6. *Tornelasmias capricorni*, Iredale.
„ 6a. *Tornelasmias capricorni*, Iredale. Mouth of immature.
„ 7. *Tornelasmias inconspicuum*, Brazier.
„ 8. *Palaina capillacea*, Pfeiffer.
„ 9. *Palaina nicholsae*, Iredale.
„ 10. *Palaina howeinsulae*, Iredale.
„ 11. *Palaina waterhousei*, Iredale.
„ 12. *Palaina macgillivrayi semilevis*, Iredale.
„ 13. *Palaina levicostulata*, Iredale.
„ 14. *Palaina edwardi*, Iredale.
„ 15. *Palaina deliciosa*, Iredale.
„ 16. *Palaina macgillivrayi*, Pfeiffer.
„ 17. *Palaina macgillivrayi pusillior*, Iredale.

EXPLANATION OF PLATE XIX.

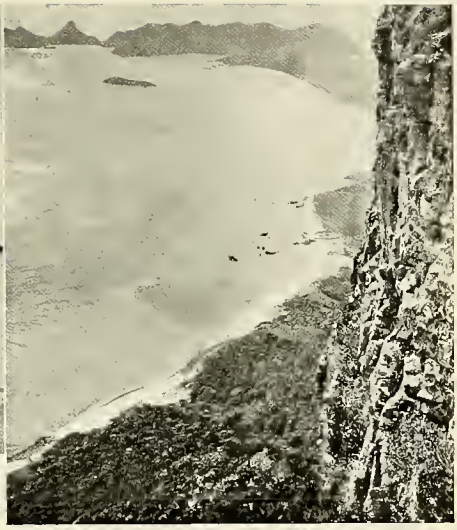
Fig. 1. *Palaina padda*, Iredale.
„ 2. *Palaina lucia*, Iredale.
„ 3. *Palaina capillacea definita*, Iredale.
„ 4. *Palaina embra*, Iredale.

„ 5. *Allenella belli,* Iredale.
„ 6. *Allenella belli extra,* Iredale.
„ 7. *Paralaoma royi,* Iredale.
„ 8. *Pernastela gnoma,* Iredale.
„ 9. *Allenella formalis,* Iredale.
„ 10. *Paralaoma abjecta,* Iredale.
„ 11. *Paralaoma innesi,* Iredale.
„ 12. *Paralaoma lidgbirdensis,* Iredale.
„ 13. *Paralaoma compar,* Iredale.
„ 14. *Charopinesta sema,* Iredale.
„ 15. *Charopinesta goweri,* Iredale.
„ 16. *Gyropena verans,* Iredale.
„ 17. *Gowieroconcha wenda,* Iredale.
„ 18. *Pernastela howensis,* Iredale.
„ 19. *Hedleyoconcha addita,* Iredale.
„ 20. *Charopella zela,* Iredale.
„ 21. *Charopinesta suavis,* Iredale.
„ 22. *Pulcharopa plesa,* Iredale.
„ 23. *Pernastela charon,* Iredale.

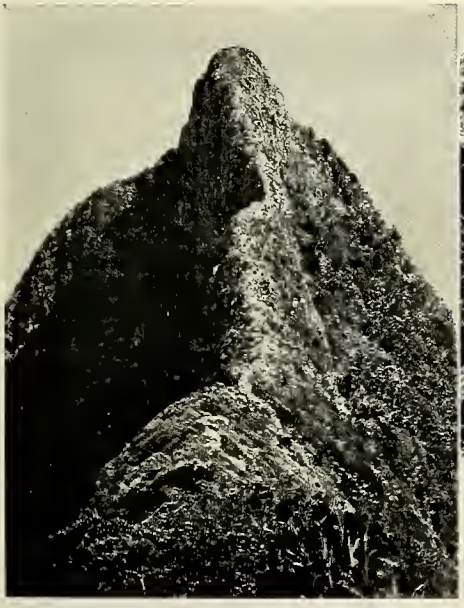
EXPLANATION OF PLATE XX.

Fig. 1. *Pseudocharopa (whiteleggei) editior,* Iredale.
„ 2. *Annacharis miranda,* Iredale.
„ 3. *Howearion belli,* Iredale.
„ 4. *Pseudocharopa imperator,* Iredale.
„ 5. *Innesoconcha princeps,* Iredale.
„ 6. *Dignamoconcha dulcissima,* Iredale.
„ 7. *Tribocystis rosacea,* Iredale.
„ 8. *Melloconcha delecta,* Iredale.
„ 9. *Melloconcha prensa,* Iredale.
„ 10. *Tribocystis flavescens,* Iredale.
„ 11. *Pseudocharopa gowerensis,* Iredale.
„ 12. *Deliciola charis,* Iredale.
„ 13. *Melloconcha grata,* Iredale.
„ 14. *Kieconcha kermadeci,* Pfeiffer.
„ 15. *Innesoconcha aberrans,* Iredale.

Mounts Lidgbird and Gower.
Lord Howe Island.



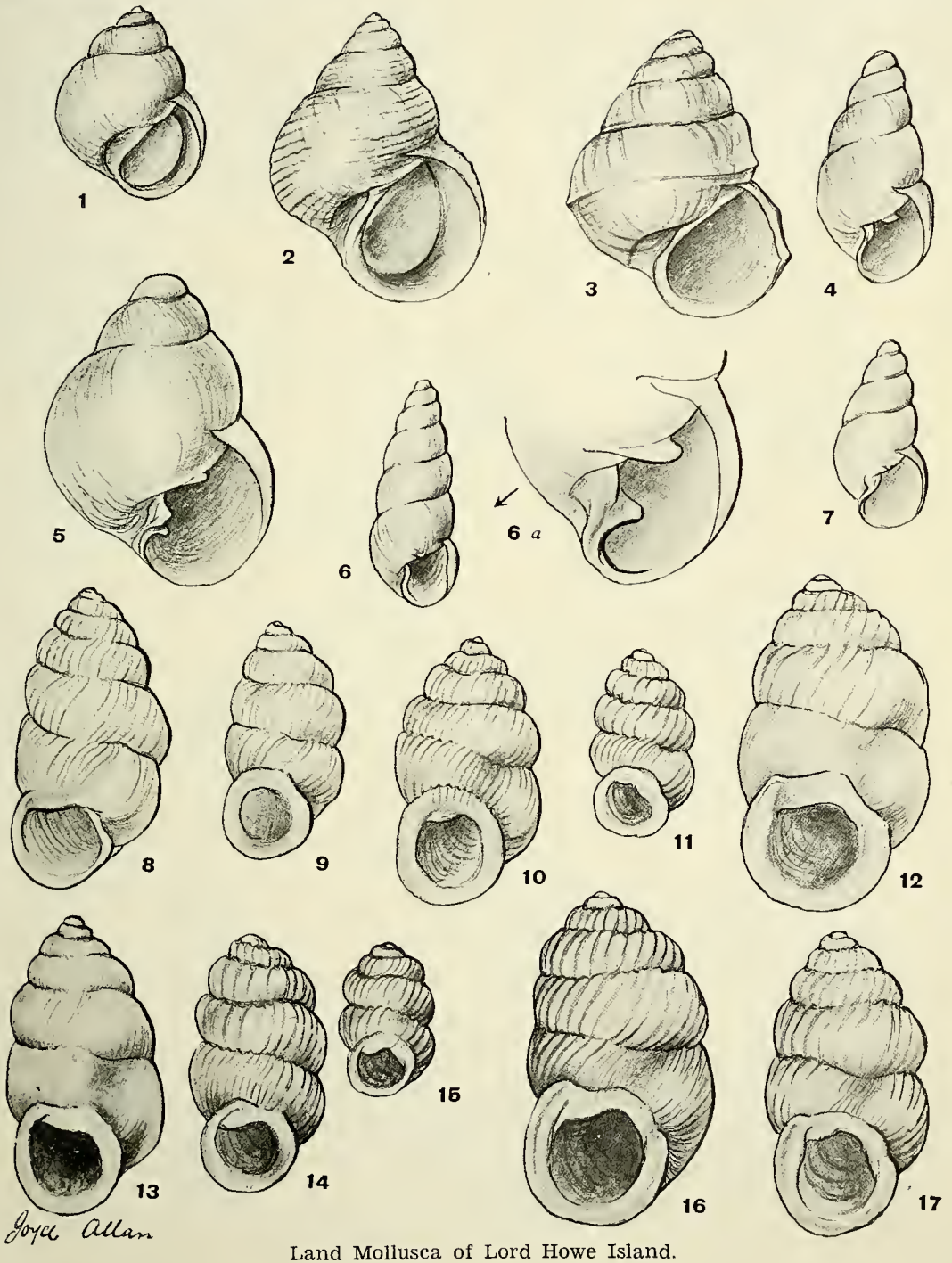
View of the Lagoon and Rabbit
Island from the Lower Road.



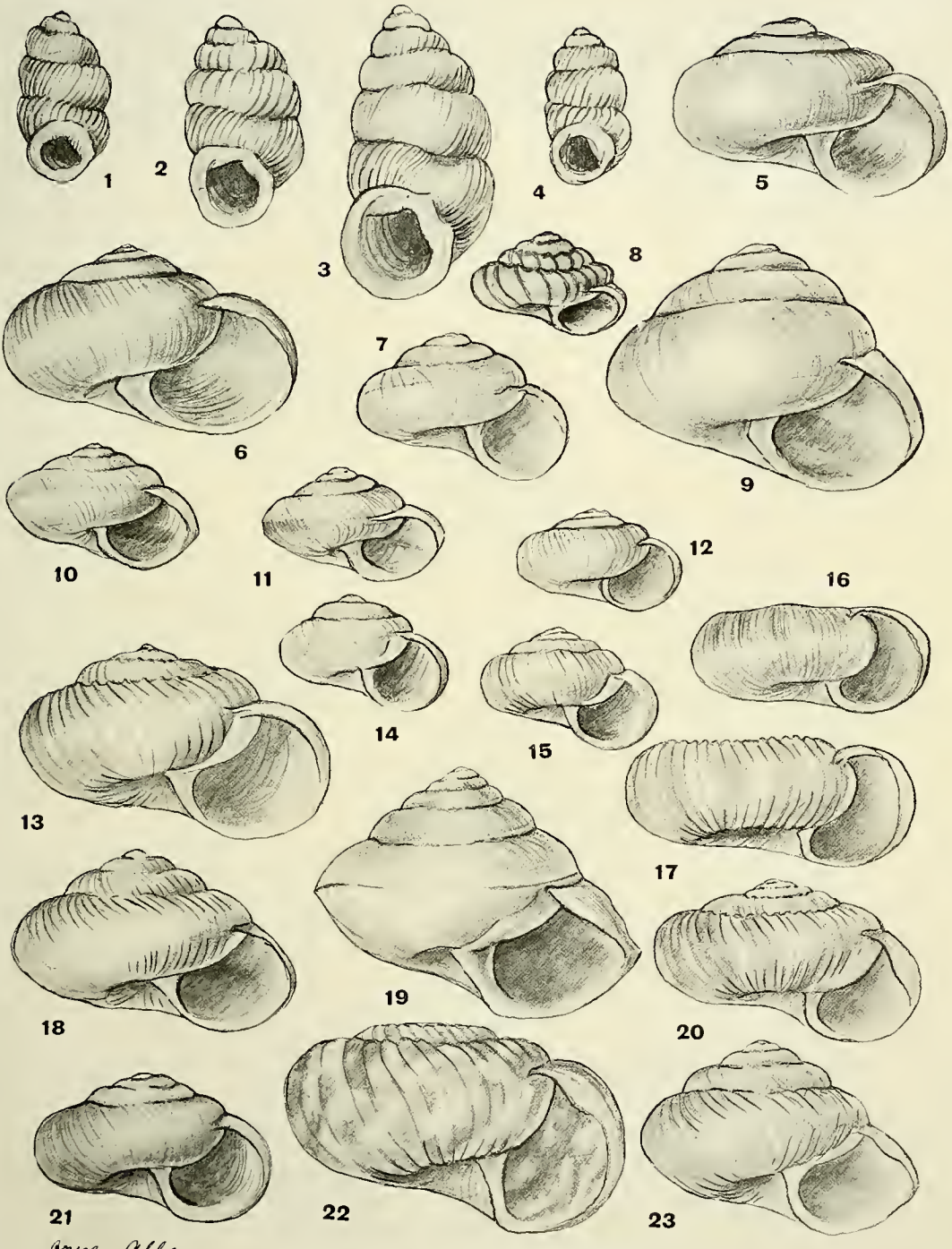
South-eastern Spur of Mt. Gower.

Characteristic Vegetation of Lord Howe Island.

Photographs by Roy Bell
and A. R. McCulloch.

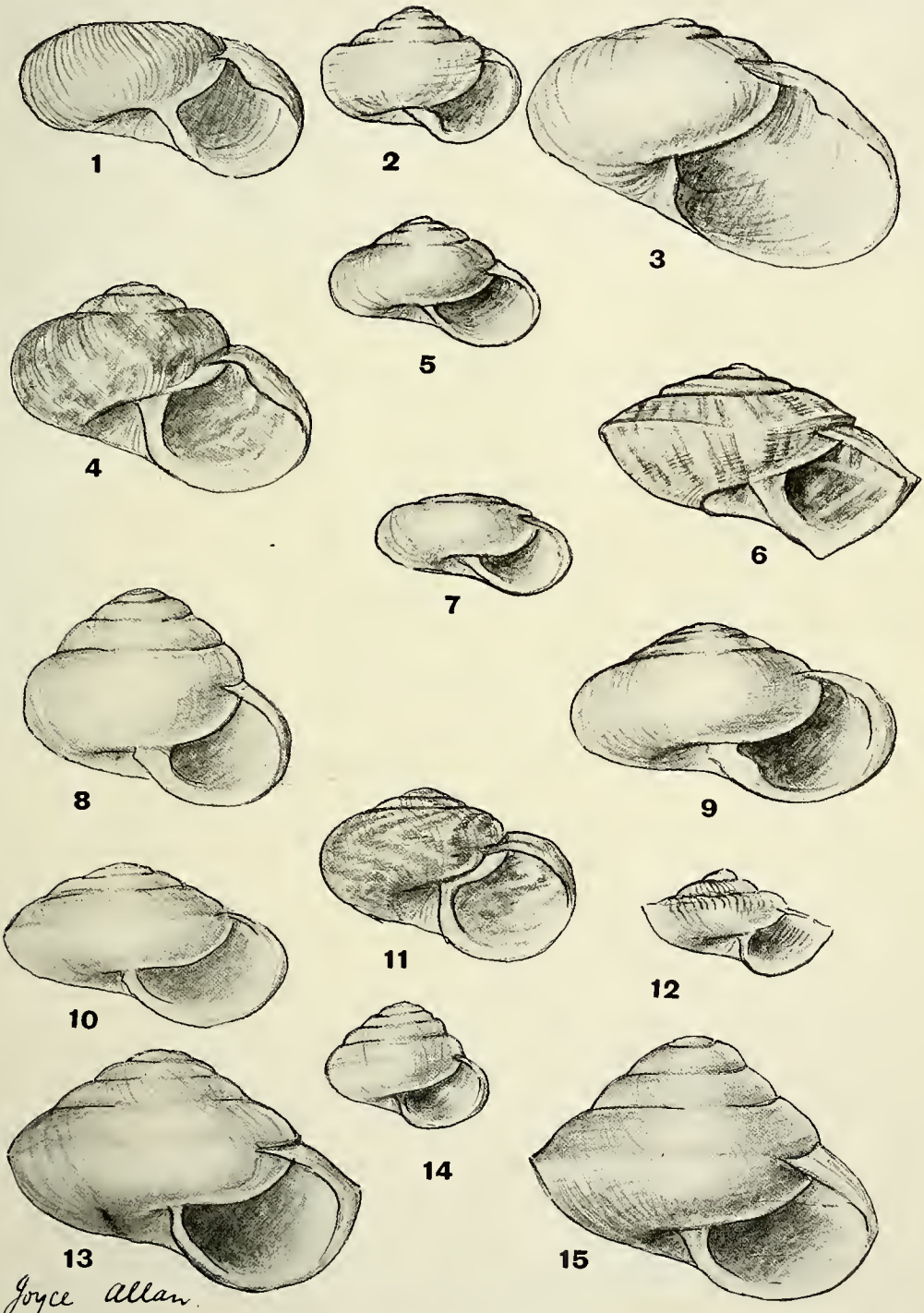


Land Mollusca of Lord Howe Island.



Joyce Allan

Land Mollusca of Lord Howe Island.



Land Mollusca of Lord Howe Island.